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# U S NAVY RESPONSE TO U S EPA REGION I COMMENTS TO REVISED DRAFT FEASIBILITY STUDY SITE 16 NCBC DAVISVILLE RI

11/08/2011

BASE REALIGNMENT AND CLOSURE PROGRAM MANAGEMENT OFFICE NORTHEAST

**DEPARTMENT OF THE NAVY**
BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE, NORTHEAST
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BPMO NE/DB
Ser 12-008
November 8, 2011

Ms. Christine Williams
Mail Code OSRR07-03
U.S. Environmental Protection Agency, Region I
5 Post Office Square, Suite 100
Boston, MA 02109-3912

Mr. Richard Gottlieb
Office of Waste Management
Rhode Island Department of Environmental Management (RIDEM)
235 Promenade Street
Providence, RI 02908-5767

Dear Ms. Williams and Mr. Gottlieb:

Enclosed is the response-to-comments (RTCs) document for follow-up comments received from EPA Region I and RIDEM on the Revised Draft Feasibility Study (FS) for Installation Restoration Program (IRP) Site 16 at the Former Naval Construction Battalion Center (NCBC) Davisville, Rhode Island. The comments were submitted to the Navy in response to the Navy's RTCs document dated August 15, 2011. The EPA follow-up comments were received in correspondence dated 26 September 2011. The RIDEM follow-up comments were received in correspondence dated 13 September 2011.

In accordance with the Federal Facilities Agreement (FFA), the Navy requests your concurrence with the following proposed submittal dates for the Draft Proposed Plan and Draft Record of Decision (ROD) and Responsiveness Summary for Site 16 at the former Davisville Naval Construction Battalion Center (NCBC), Rhode Island.

| Document | Draft Proposed Plan | Draft Record of Decision (ROD) and Responsiveness Summary |
|---|---|---|
| Current Date | 11-15-2011 | 04-15-2011 |
| Proposed Date | 06-03-2012 | 11-03-2012 |

This schedule adjustment is necessary because of the time required to resolve the follow-up regulatory comments on the Revised Draft Feasibility Study for Site 16, published on February 26, 2011 and because of on-going discussions between the Navy, EPA Region I, and RIDEM regarding the alternatives to be presented in the Site 16 FS. The Navy believes that the on-going discussions continue to be critical to the finalization of the Site 16 FS and the development of the Proposed Plan. Towards that end, the Navy is currently preparing an

additional FS soil/groundwater alternative as requested by the regulatory agencies. This additional alternative will be forwarded to the EPA Region I/RIDEM by 12/15/11. In accordance with the review procedures as outlined in the FFA the Agency's review of the alternative would be furnished to the Navy no later than January 30, 2012 and Navy response provided no later than March 17, 2012. Pending any need for informal resolution of comments the Navy would issue the Draft Final FS no later than May 2, 2012 with a subsequent issuance of the draft proposed plan on June 3, 2012 following receipt of agency concurrence on the Draft final FS.

If you have any questions, please do not hesitate to contact me at 617-753-4656.

Sincerely,

David Barney
BRAC Environmental Coordinator
By direction of BRAC PMO

Enclosures:
1. RTCs document for follow-up comments received from EPA Region I on the Revised Draft FS for IRP Site 16 at the former NCBC Davisville, RI
2. RTCs document for follow-up comments received from RIDEM on the Revised Draft FS for IRP Site 16 at the former NCBC Davisville, RI

Copy to:
J. Dale, Navy RPM (1 copy)
L.Rapp/B/ Capito (NAVFAC) (electronic)
S. King, Quonset Development Corporation (1 copy)
J. Reiner, Town of North Kingston (1 copy)
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L. A. Sinagoga, TtNUS Project Manager (1 copy)
G. Wagner, TtNUS, Admin Record (1 copy)
TtNUS Project Files (CTO WE 51 112G02584), S. Currie

**ENCLOSURE 1**

**RTCs DOCUMENT FOR FOLLOW-UP COMMENTS RECEIVED FROM EPA REGION I ON THE REVISED DRAFT FS FOR IRP SITE 16 AT THE FORMER NCBC DAVISVILLE, RHODE ISLAND**

# Navy Response to Follow-Up United States Environmental Protection Agency (USEPA) New England – Region I Comments on Revision 1 of the Feasibility Study for IRP Site 16 (Dated February 2011) Former Davisville Naval Construction Battalion Center (NCBC), Davisville, Rhode Island (USEPA Region I Correspondence Dated September 26, 2011)

## EPA General Comments (Presented in EPA Cover Letter)

**EPA Comment No. 1:** The requirement for cleanup of groundwater to drinking water standards must, by definition, include risk based health advisories and maximum contaminant level goals (MCLGs) as ARARs.

***Navy Response to Comment No. 1:*** *Per the Navy/EPA teleconference of October 12, 2011, it is the EPA's position that non-zero maximum contaminant level goals (MCLGs) are to be used and cited as Applicable or Relevant and Appropriate Requirements (ARARs) and, as long as an aquifer is classified as a potential drinking water source, then the MCLGs are considered relevant and appropriate.*

*For purposes of the NCBC Davisville Site 16 FS, the Navy agrees to cite the non-zero MCLGs for the Site 16 groundwater chemicals of concern (COCs) as relevant and appropriate. The COCs in the Site 16 groundwater and their respective MCLs/MCLGs are such that the decision to cite or not cite the MCLGs and ARARs has no impact on the alternatives presented in the Site 16 FS.*

*Regarding manganese (also discussed during the Navy/EPA teleconference of October 12, 2011), the health advisory for manganese (300 ug/L) is not considered an ARAR because the activity-specific background concentration exceeds the current health advisory values for manganese.*

**EPA Comment No. 2:** LUCs under the MARAD transfer should not be discussed as being part of the "no action" alternative.

***Navy Response to Comment No. 2:*** *Per the BRAC Clean-up Team meeting of September 22, 2011, any discussion of the current MARAD land/groundwater use restrictions will be restricted to the introductory sections of the Site 16 Feasibility Study (FS) only.*

**EPA Comment No. 3:** The groundwater alternatives must be clearly and transparently defined and justified. Please schedule a technical meeting for a more thorough technical discussion of the Navy's groundwater alternatives.

***Navy Response to Comment No. 3:*** *A technical teleconference was held on October 18, 2011. The notes from that teleconference are included as Attachment A to this response-to-comments (RTCs) document.*

**EPA Comment No. 4:** While the use of a waste management unit seems to be agreed upon, the proposed changes to the alternatives have not been provided for EPA review. Please provide.

***Navy Response to Comment No. 4:*** *An alternative considering the North Central Area (NCA) of Site 16 a "waste management unit" will be added to the Site 16 FS. A bulleted summary of this alternative is Attachment B to this letter.*

## EPA Specific Comments

**EPA Comment p 1, N.Resp.Cmt 2:** In the first paragraph regarding the Navy's ARARs comment – solid or hazardous waste landfill standards may be relevant and appropriate for the site, if waste is going to be left in place under a cap/cover. Some, but not all, of the landfill provisions may be relevant and appropriate, particularly if the waste is debris that was buried on site (such as from filling wetlands). However, the waste does not need to be capped/covered under landfill standards to be a "waste management unit," rather the cap/cover could be compliant with the RI Remediation Regulations (if the cap/cover meets the Regulations risk-based standards)

***Navy Response to EPA Comment p 1, N.Resp.Cmt 2:*** *Comment Acknowledged. However, the contaminated soil is not being considered waste to the extent that landfill closure-type regulations are required as ARARs.*

**EPA Comment p 2, N.Resp.Cmt 2 and 93:** While the proposed cover design may be compliant with direct contact standards, it also needs to meet leachability standards, if they apply. They would apply if the contaminants in the vadose zone potentially could cause a risk by migration into the harbor in the future. A contingency remedy needs to be included in the ROD to ensure a remedy is agreed to if contaminants in the vadose zone above leachability criteria now then migrate to the harbor in the future and cause a risk to the flora or fauna in the nearshore.

***Navy Response to EPA Comment p 2, N.Resp.Cmt 2 and 93:*** *Based on the EPA/Navy discussions of Tuesday, October 18, 2011, it is the Navy's understanding that the EPA is concerned about the potential migration of the CVOC plume underlying Site 16 to the surface waters/sediments of Allen Harbor at concentrations that may "cause a risk to the flora and fauna in the nearshore" of Allen Harbor at some time in the future. We believe this concern is similar to the EPA's concern regarding the potential for*

*CVOC migration from Sites 07/09 source areas to the adjoining surface water bodies. However, the results of the Phase III RI indicate that Allen Harbor has not been impacted by site-related, vadose-zone CVOC soil contamination from Site 16 source areas and it is very unlikely that the Harbor would be impacted by such contamination in the future. Specifically:*

- *There is limited residual volatile organic chemical (VOC) contamination in the vadose-zone soils at Site 16. All of the investigations conducted to date consistently indicate that the releases contributing to the plume underlying Site 16 are old. VOCs are detected primarily in the deeper saturated zone soils (versus the upper unsaturated/vadose zone soils) and in intermediate/deep overburden and bedrock groundwater (versus the shallow overburden system). This is as expected given the vertical and horizontal groundwater gradients at Site 16.*

- *VOCs have been detected in the groundwater plume that extends underneath Allen Harbor. The maximum trichloroethene concentration detected in samples from the shallow-most groundwater zone (underlying Allen Harbor) sampled during the 2010 environmental sampling event is approximately 300 ug/L, which is less than the available ecological screening levels for trichloroethene. Additionally, VOCs have not been detected in the surface water or sediment samples collected from Allen Harbor at concentrations that would cause a risk to the flora or fauna of Allen Harbor. This is because VOCs in the groundwater plume at the southern edge of Allen Harbor do not exceed 2,000 ug/L (approximately) and, thus, VOC concentrations entering the Harbor are rapidly depleted due to biodegradation and dilution.*

*Given the on-going investigations/long-term monitoring programs at Sites 07 and 09, the Navy understands and concurs with the EPA's concern to act in a manner protective of Allen Harbor. However, the VOC concentrations detected in the Site 16 groundwater plume are orders of magnitude less than those detected in the groundwater underlying Sites 07 and 09. None of the investigative work conducted to date suggests that contaminant levels have the potential to increase in the future.*

**EPA Comment p 7; 12, N.Resp.Cmt 7 and 5 and EPA General Comment No. 5:** Decisions related to PFOS/PFOA can be made after review of forthcoming data.

***Navy Response to EPA Comment p 7; 12, N.Resp.Cmt 7 and 5 and EPA General Comment No. 5:*** *Agree.*

**EPA Comment p 4, N.Resp.Cmt 8:** A more transparent approach to adding contingency to remediation estimates (such as adding a contingency percentage to treatment costs due to uncertainty in treatment area extent and concentration) would allow for better transparency and consistency when comparing

between alternatives. It is acknowledged that some groundwater treatment alternatives costs are less sensitive to over-estimates of contaminant mass, such as in-situ chemical oxidation which is driven often by total oxidant demand from non-target naturally-occurring compounds and overall size of the treatment area. However, the extent of the treatment area also appears to be overestimated by the Navy, leading to larger than necessary treatment networks (i.e. more extraction wells, injections points, or treatment barriers) under all treatment alternatives. While the RI/FS process is intended to assist with programming of remediation budgets, its primary task in regards to cost is to provide a means for comparison of alternatives. The Navy's approach to building conservatism into each treatment alternative has not allowed for appropriate comparison of the viable alternatives.

***Navy Response to EPA p 4, N.Resp.Cmt 8:*** *Disagree. This comment is a continuation of the previous set of EPA comments. Please note that even if the Navy were to revise the plume contours, the costs of the alternatives are driven primarily by the volume of contaminated media and it is unlikely that the order of the costs for each alternative from smallest to largest would change. It is also emphasized that active treatment would be performed within a given concentration contour and the overall time for the alternatives to meet PRGs would not be changed, even if the contours were redrawn as requested.*

**EPA Comment p 15, N.Resp.Cmt 9:** The source of the contamination does not preclude CERCLA liability, so if the PAHs are from asphalt or building debris that has been used as fill at the Site by the Navy historically, the Navy is still responsible for addressing the material under CERCLA. The material does not have to come from a "release from specific units or processes associated with past Navy operations," the filling/disposal of material in the area is a "past Navy operation." Was the asphalt or building debris used as fill in this area?

***Navy Response to EPA Comment p 15, N.Resp.Cmt 9:*** *Disagree. As indicated in the original response to this comment, the most likely explanation for the detection of PAHs in this area is that the PAHs are associated with the asphalt (which is everywhere in this portion of Site 16) and/or with remnants of buildings that have been razed. There is no way, based on the currently available historical information, to determine whether or not asphalt or building debris was used as fill in this area. However, based on soil borings installed in the former Building 41 area in 2007 through 2010, it does not appear that asphalt was used as fill since it is typically only encountered in the upper few feet within the various borings. Also, from a practical point of view, remediation of PAHs in this area is problematic. The area is currently used to stage vehicles prior to distribution via truck or rail. Thus, the area has been paved with asphalt and will likely be periodically re-paved by with asphalt in the future. In fact, limited re-paving occurred throughout 2007 and 2010 in this general area. Existing soils within the area are currently in contact with the PAH-containing asphalt and will likely to continue to be in contact with the PAH-containing asphalt in the future.*

**EPA Comment p 15, N.Resp.Cmt 10:** A release from "the immediate vicinity of the Sea Freeze building" is still under CERCLA jurisdiction for this Site even though it may not be associated with "the Site 16 CVOC plume." Any releases from within the operable unit that pose a CERCLA risk need to be addressed by the alternatives in this FS. It is understood that this part of the plume is a distal part and that Navy alternatives include MNA to cleanup the distal parts of the plume.

***Navy Response p 15, N.Resp.Cmt 10:*** *Disagree. As indicated in the original response to this comment, the Site 16 source areas are not the source of the tetrachloroethene (PCE) detected in the Sea Freeze building area. The limited area where PCE was detected is separate and distinct from the Site 16 plume and is, therefore, not part of this operable unit. The land in question was transferred in 1980 prior to the enactment of CERCLA. If the EPA believes the release occurred prior to property transfer (OR due to Navy operations), they can consult the US Army Corps of Engineers Formerly Used Defense Sites (FUDS) program office.*

**EPA Comment p 16, N.Resp.Cmt 15 – 19:** The Navy concurred that tighter contours were supported by the data, but that the conservative estimate of potential remediation area was appropriate. However, the Navy's 500 µg/L and 1,000 µg/L isoconcentration contours appear to not accurately depict current VOC concentrations, and therefore overestimate the area of remediation. A clearer approach to adding contingency to remediation estimates (such as a contingency percentage on costs) would allow for better transparency and consistency when comparing between alternatives. Given that conservative estimates were used for both extent and contaminant mass, the degree of conservatism is not always apparent to the reviewer. See also the technical response to General Comment No. 8.

***Navy Response to EPA Comment p 16, N.Resp.Cmt 15 – 19:*** *Please see response to EPA Comment No. 8 (presented above). Also, a few of the 1,000 ug/l contours could be re-interpreted and drawn smaller because of the limited number of wells with concentrations greater than 1,000 ug/l. However, the 500 ug/L and 5 ug/L contours are based on a greater density of wells; the contours cannot be redrawn smaller. Also, please note that another major EPA comment/concern is the time predicted for MNA to achieve preliminary remediation goals (PRGs). There is no question that the rate for MNA at Site 16 is slow.*

**EPA Comment p 19, N.Resp.Cmt 24:** EPA asked that the sentence be removed because the State's classification of the groundwater as GB has no relevance to the CERCLA remedy. Instead the Navy can state: "Note that Site 16 is located in an area regulated under the Federal Safe Drinking Water Act as a potable aquifer, except where the groundwater is saline. Safe Drinking Water Act regulatory standards

(MCLs and non-zero MCLGs), along with Federal risk-based standards, were used in the selection of COCs."

***Navy Response to EPA Comment p 19, N.Resp.Cmt 24:*** *The comment applies to a section of the FS that is discussing the Chemicals of Concern in Groundwater. The subject sentence is only about the selection of COCs at the RI stage: "Note that although Site 16 is located in an area with an RIDEM groundwater classification of GB, the GB criteria were not used in the selection of COCs." The discussions of the groundwater and EPA classifications were made clear in Section 2.1. (Also, the GB criteria were included in the Section 2 PRG tables as points of reference but, for the Site 16 COCs, they exceed SDWA MCLs.)*

**EPA Comment p 19, N.Resp.Cmt 26:** Change the Navy's proposed text to: "and meet the selected PRGs identified in Table 2-4 outside of any waste management area established as part of the soil remedy." Note also that Table 2-4 needs to be relabeled "Preliminary Remediation Goals/Performance Standards – Groundwater" with a footnote explaining that inside any waste management area the values are Performance Standards and outside the waste management area the values are PRGs.

***Navy Response EPA Comment p 19, N.Resp.Cmt 26:*** *Agree.*

**EPA Comment p 19, N.Resp.Cmt 27:** The sentence can read: "No RAOs were developed for TPH contamination in soil since CERCLA does not have jurisdiction for TPH. TPH will be addressed separately under State authority."

***Navy Response EPA Comment p 19, N.Resp.Cmt 27:*** *Agree.*

**EPA Comment p 20, N.Resp.Cmt 32:** Navy's clarifications addressed validity of development of lead PRG, but not arsenic PRG. The development of a site-specific arsenic background for the site based on collection of 7 samples is not clearly justified. Goodness of fit statistics for the fit of limited background arsenic soil data to a log-normal distribution were not provided, and alternative probability distributions where not presented for the data (which may fit the data better). As such the validity of the fit of the data to this distribution and subsequent use of the log-normal distribution is not fully supported. The use of the Upper Prediction Limit as a PRG rather than the 95% Upper Confidence Limit of the mean (as is done in RIDEM background development) should also be justified further.

***Navy Response to EPA Comment p 20, N.Resp.Cmt 32: Goodness-of-fit testing:*** *Goodness of fit statistics were calculated for the background arsenic concentrations using the USEPA software ProUCL*

*(see Attachment C). Based on the goodness of fit statistics calculated by ProUCL (at a five percent significance level), the background arsenic data follow a log normal distribution.*

***Use of upper confidence limits versus upper prediction limits:*** *Often in environmental applications, site concentrations are compared to background level concentrations, also called background threshold values. The Technical Guidance for USEPA's ProUCL version 4.1 recommends upper percentiles, upper prediction limits, upper tolerance limits, and IQR upper limits be used as not to exceed values (USEPA, May 2010). Therefore, for arsenic the upper prediction limit was calculated and used as the background value and subsequent PRG for arsenic.*

**EPA Comment p 21, N.Resp.Cmt 33:** The Navy's response does not directly address EPA's concern that the naphthalene background value (500 µg/kg) used as the PRG was not developed based on an EPA-approved method or the site-specific SSL of 18 µg/kg based on leachability. Please address.

***Navy Response to EPA Comment p 21, N.Resp.Cmt 33:*** *The Navy is considering designating the North Central Area (NCA) of Site 16 as a waste management unit. In that case, soil PRGs (protective of the underlying groundwater as a potential drinking water source) for the NCA vadose zone soils would not be necessary. However, by way of explanation, the Navy considered site-specific information (e.g., total organic carbon), literature Kd values (6.5), and standard EPA equations (from the SSL guidance website) to initially develop a soil PRG (SSL protective of groundwater) of 18 ug/kg. This concentration is obviously lower than any anthropogenic background concentrations published in the literature (see Attachment D) and, thus, is of very limited value as a PRG. The Navy also examined available soil/groundwater "data pairs" for the shallow monitoring wells in the NCA, specifically data for MW16-07, TW16-112S, TW16-110S, MW16-46, and MW16-45 were evaluated. An approximate Kd of 5000 was calculated based on these soil/groundwater data pairs (see Attachment D). This yields an SSL of approximately 700 ug/kg. Because of the limited number of soil/groundwater data pairs and the variability noted in the available data pairs, the Navy elected to conservatively select the typical background value for naphthalene suggested by the State of Massachusetts (500 mg/kg). The Navy agrees that a site- or base-specific background value would be superior to this value. However, unlike metals, background PAH concentrations are more reflective of anthropogenic activities in an area versus actual soil type. Thus, the collection of site-specific background data is less critical for PAHs than for metals. This is particularly true for a well-developed area such as NCBC Davisville. Finally, please review the Phase III RI data for groundwater samples collected in the NCA. The PAH concentrations detected are typically in the ng/L to low-ug/L concentrations and are not indicative of significant, widespread migration of PAHs from soils to groundwater.*

**EPA Comment p 22, N.Resp.Cmt 39:** Unclear to EPA what the sentences that we requested removed actually mean. What is the significance of the "relatively high mass" of lead being the reason why the lead is at "environmentally acceptable concentrations." Is the Navy attempting to say: "Although the mass of lead relative to other soil contaminants is high, lead levels do not exceed risk-based standards for unlimited use of the area."

***Navy Response to EPA Comment p 22, N.Resp.Cmt 39:*** *Agree.*

**EPA Comment p 22, N.Resp.Cmt 41:** EPA has determined that Federal Drinking Water (MCLs and non-zero MCLGs) and risk-based standards (Health Advisory for manganese) are the ARARs for groundwater at the Site. They need to be included in Table 2-1 for any groundwater treatment alternatives as cleanup standards and in Table 2-5 as monitoring standards for any alternatives requiring monitoring and institutional controls for areas within the compliance boundary for any waste management areas. Note that the text for these standards in Table 2-5 is incorrect in that groundwater throughout the Site (where soil contamination is being managed in place) will not achieve drinking water standards inside the compliance boundary. Instead, the standards are only used to monitor the areas to ensure that groundwater exceeding the standards does not migrate beyond the compliance boundary.

***Navy Response to EPA Comment p 22, N.Resp.Cmt 41:*** *Table 2-5 will be revised as noted in the comment regarding reference to the compliance boundary. Upon further review, the Navy agrees that non-zero MCLGs will be added as relevant and appropriate. MCLGs of zero will not be considered. The COCs with non-zero MCLGs will be noted. Per EPA/Navy discussions of October 12, 2011, the health advisory for manganese will not be cited because the NCBC background manganese concentration (3,292 ug/L) exceeds the health advisory.*

**EPA Comment p 23, Table:** Use Table text for MCLGs as provided by EPA (see previous comment).

***Navy Response to EPA Comment p 23, Table:*** *Partly agree per response to Comment 41 (above). That is, non-zero MCLGs are as relevant and appropriate. Zero MCLGs will not be included as ARARs or TBCs. The COCs with non-zero MCLGs will be noted.*

**EPA Comment p 24, 1st Table:** Use Table text for EPA Health Advisory as provided by EPA (see comment for p. 22, N.Resp.Cmt 41).

***Navy Response to EPA Comment p 24, 1st Table:*** *Please see Response to Comment 41 (above).*

**EPA Comment p 24, N.Resp.Cmt 42:** Retain text referring to the 500-year floodplain since the regulation include jurisdiction up to the 500-year flood elevation.

***Navy Response to EPA Comment p 24, N.Resp.Cmt 42:*** *Disagree. As specified in 44 CFR 9, the 500-year floodplain only applies to "Critical Actions" defined as follows:*

> *"Critical Action means an action for which even a slight chance of flooding is too great. The minimum floodplain of concern for critical actions is the 500-year floodplain, i.e., critical action floodplain. Critical actions include, but are not limited to, those which create or extend the useful life of structures or facilities:*
>
> *(a) Such as those which produce, use or store highly volatile, flammable, explosive, toxic or water-reactive materials;*
>
> *(b) Such as hospitals and nursing homes, and housing for the elderly, which are likely to contain occupants who may not be sufficiently mobile to avoid the loss of life or injury during flood and storm events;*
>
> *(c) Such as emergency operation centers, or data storage centers which contain records or services that may become lost or inoperative during flood and storm events; and*
>
> *(d) Such as generating plants, and other principal points of utility lines."*

*None of these actions apply to the remedial alternatives in this FS so the ARAR does not apply.*

*Further, consider the RCRA citing regulations for hazardous treatment, storage and disposal facilities (40 CFR 264.18(b)). This regulation only uses the 100-year floodplain for materials that may be highly contaminated. Thus, the 500-year floodplain benchmark in 44 CFR 9 should not be cited.*

*Portions of 44 CFR 9 that apply to the 100-year floodplain are applicable.*

**EPA Comment p 25, N.Resp.Cmt 44:** The Navy's response is inconsistent with its response to Comment 43 in that the Navy agreed to add the Endangered Species Act to address potential sea turtle habitat in Allen Harbor, but states the Fish and Wildlife Coordination Act, which also addresses protecting the aquatic habitat in Allen Harbor is not Applicable. Unless the remediation is outside of the coastal flood zone for the Harbor, include both of these statutes as ARARs.

***Navy Comment to Response EPA Comment p 25, N.Resp.Cmt 44:*** *Disagree. In Comment No. 44, the Synopsis provided states:*

*"Requires Federal agencies involved in actions that will result in the control of [sic] structural modification of any stream or body of water for any purpose..."*

*The alternatives do not include any actions to control or structurally modify a stream or body of water. Therefore, the subject Act was excluded. The exclusion of this Act is not inconsistent with the inclusion of ESA. For example, a direct discharge to the Bay could impact ESA.*

**EPA Comment p 25, N.Resp.Cmt 45:** EPA's reply to this response is consistent with its previous responses to the Navy regarding groundwater performance standards/PRG and background guidance standards within this document.

***Navy Response EPA Comment p 25, N.Resp.Cmt 45:*** *Comment acknowledged. Please see Navy response to Comments 33 and 41.*

**EPA Response to EPA Specific Comment No. 46 & 48:** Concur, provided that this language ("The risk must be evaluated at each well after concentrations of all COCs have decreased below their MCLs." is included in the ROD. EPA reiterates that MCLs are not necessarily considered to be protective if the risk associated with the MCL is higher than EPA's risk management criteria of HQ =1 and cancer risk >1E-04. The NCP requires that remedies achieve both ARARs and protection of human health and the environment.

***Navy Response to EPA Cmt 46 & 48:*** *Agree.*

**EPA Comment p 26, N.Resp.Cmt 49:** As previously noted MCLGs should not be deleted from the Table.

***Navy Response to EPA p 26, N.Resp.Cmt 49:*** *Partially agree. Please see response to Comment No. 41.*

**EPA Comment p 27, N.Resp.Cmt 50:** As previously noted Health Advisories should not be deleted from the Table.

***Navy Response to p 27, N.Resp.Cmt 50:*** *Disagree. See previous responses regarding the use of the Health Advisory for manganese. (Response to Comment 41.)*

**EPA Comment p 27, N.Resp.Cmt 51:** Pore water and/or sediment monitoring may be required to assess the protectiveness of the groundwater and/or soil alternatives. How will it be possible to assess any potential risk if contaminants in the vadose zone leach into groundwater at high enough concentrations or site groundwater plumes move out into the Harbor and emerge into the intertidal or subtidal zone (as occurred at Calf Pasture Point). While there is no current risk from either of these issues, the remedy should include monitoring and a contingency remedy to address any future risk from migration from under the soil cover being proposed.

***Navy Response to EPA Comment p 27, N.Resp.Cmt 51:*** *Please see response to EPA Comment 2. Also, given the level of contamination detected in the groundwater underlying Site 16, the Navy does not envision the need for long-term monitoring of the surface waters/sediments of Allen Harbor.*

**EPA Comment p 27, N.Resp.Cmt 52:** Any cap/cover installed under the soil alternatives will require storm drainage of some sort. Any cap/cover within the coastal flood zone the cap/cover needs to have drainage that will prevent washout, so these standards need to be complied with.

***Navy Response to EPA Comment p 27, N.Resp.Cmt 52:*** *Disagree. The cited law appears to be for small municipal separate storm sewer systems (MS4s). Drainage to prevent the washout of a cover would be part of the design of the cover. Existing storm water conveyance would be used as needed, however, no significant changes in the grade are envisioned. Section 45-61.1-2(b) discusses inspection, and that component might be usable. However, it must be recognized that inspection and maintenance will be required as part of the LUCs, so citing this law does not add any level of protectiveness to the alternatives. (Note that the Navy may need to modify any existing swales based on which cap, if any, is selected [permeable/non-permeable, etc.].)*

**EPA Comment p 28, N.Resp.Cmt 54:** Section 3.2 only should cover screening for CERCLA technologies and process options so remove any mention of TPH. If a technology or process option that addresses CERCLA contaminants also addresses TPH that is not a problem but the text shouldn't take into account whether a technology or process option is effective or not in addressing TPH.

***Navy Response EPA Comment p 28, N.Resp.Cmt 54:*** *Agree.*

**EPA Comment p 29, N.Resp.Cmt 62:** It is unclear to EPA how an effective "cover/containment" remedy can be implemented using newly constructed or existing cover without the integral use of LUCs to ensure

the maintenance of such structures. As such, it would appear prudent to add reference to use of LUCs under the containment alternative.

***Navy Response to EPA Comment p 29, N.Resp.Cmt 62:*** *Agree. Although the requirement for long-term maintenance is mentioned in the description, additional text can be added to indicate that long-term maintenance would be implemented through a LUC.*

**EPA Comment p 29, N.Resp.Cmt 64:** If the Navy decided the add on-site treatment to the remedy after the ROD without evaluating on-site treatment in this FS the Navy would be required to issue a ROD amendment. If on-site treatment is evaluated in this FS the Navy likely would only need to issue an ESD.

***Navy Response to EPA Comment p 29, N.Resp.Cmt 64:*** *Comment acknowledged.*

**EPA Comment p 30, N.Resp.Cmt 68, 72, 75, 88-90, 114-117, 121, 122, 125, and 130:** Although EPA withdraws its opposition to including an alternative for MNA in section 3 given that the Conclusion states that MNA will be used in combination with other process options. Note however that the fourth sentence of the response is inaccurate because the EPA MNA guidance documents EPA policy regarding the use of MNA for CERCLA remedies. Furthermore, the fifth sentence is inaccurate because the Guidance does address what a reasonable time period for MNA is – for example in the first paragraph on page 13 of the Guidance it states: "EPA expects that **MNA will be an appropriate remediation method only where its use will be protective of human health and the environment and it will be capable of achieving site-specific remediation objectives within a timeframe that is reasonable compared to other alternatives."**

However, based on the groundwater data, MNA screening results, and BIOCHLOR modeling results presented, it does not appear that the estimate of the timeframe to achieve the PRGs under alternatives G-2 through G-6 has been done with enough accuracy to warrant that discussion at this point.

Based on a review of the MNA modeling results and groundwater monitoring data for the Site 16, it seems the rate of TCE degradation is overstated by the Navy, and the timeline to site closure under a MNA-only and/or groundwater treatment followed by MNA approach is not able to be accurately estimated by the BIOCHLOR model.

Very limited presence of *cis*-1,2-DCE and vinyl chloride provide the strongest evidence that only insignificant biodegradation is occurring.

The use of site data to calibrate the BIOCHLOR model does not appear to be valid. Firstly, although the model is simplistic it does contain a number of parameters which are calibrated to "fit the data", including rates for longitudinal dispersion, biodegradation of VOCs, and at times seepage rate, and even the input source concentration. With increasing numbers of parameters, more data points are required to effectively calibrate it, increasing the risk of obtaining a great "data fit" or corroboration but from a meaningless model (one which has extra terms which do not actually have any statistical significance or may interfere with proper calibration of the model).

Typically, this is avoided by using larger data sets, and limiting the number of parameters in a model. Although the model has been calibrated to show the shape of the field data, it does not appear possible to prove the varying of the source concentration, seepage rate, and calibration of longitudinal dispersion or biodegradation rate are valid. In other words, the model has too many parameters and/or input assumptions that can be adjusted/calibrated and not enough data to justify those modeling decisions.

Secondly, the calibration of the model's biodegradation rate does not appear to be valid considering the data used and assumptions made. The biodegradation rate was calibrated using an assumed starting source concentration and one set of groundwater data from approximately 50 years (year 2004) after the release. This is not a sound method as it does not use two data sets separated by time (rather one assumption which is varied based on the best fit of the resulting model and one true data set). This procedure is repeated twice, for a second data set (year 2007), with similar results, which does not make the model any more valid.

The closure timeframes estimates provided by the BIOCHLOR model do not appear valid enough to determine the timeliness of MNA based remedies, and therefore, without further justification MNA is not supported as a viable alternative.

Another approach such as developing a 2-D or 3-D advection and dispersion model (without biodegradation or a very conservative biodegradation rate) based on actual groundwater data (rather than assumed source values) and published parameter values may be more representative of the plume and be more defensible at predicting future timelines to achieve the PRG.

We suggest a technical meeting to more thoroughly discuss this issue and issues concerning the other groundwater alternatives.

Additionally, alternative GW-2 does not demonstrate that the hotspots that act as continuing source areas would be addressed. GW-2, MNA only, is not an acceptable final remedy since the source areas would not be addressed. We have discussed the idea of interim goals of cleanup to the State GB levels

actively/quickly with the MNA to kick in after; however, during the meeting on September 22, 2011 Navy did not present any new alternatives with this idea. We tentatively scheduled a meeting for October 18, 2011 to further discuss the groundwater alternatives. Please provide additional information/new alternatives with interim goals prior to the meeting.

***Navy Response to EPA Comment p 30, N.Resp.Cmt 68, 72, 75, 88-90, 114-117, 121, 122, 125, and 130:*** *Agree that the guidance does state that MNA is an appropriate remediation method where it is capable of achieving site-specific remediation objectives within a timeframe that is reasonable compared to the other alternatives. However, note that with the exception of Alternative G-6, the timeframes for the other alternatives are all 100 to 150 years. The MNA alternative G-2 requires 300 years. All of these alternatives have long timeframes and the timeframe for Alternative G-2 is not unreasonable compared to the others. Alternative G-6 has a shorter timeframe, but this accomplished through a significantly higher short term impacts and cost.*

*The Navy disagrees with the EPA assessment that the BIOCHLOR modeling produces inaccurate timeframes to reach clean-up criteria concentrations. However, the Navy does acknowledge that the timeframes are conservative estimations and actual times may be shorter than predicted, due to various uncertainties and data limitations as discussed in the BIOCHLOR evaluation. Based on the conference call on October 18 and pre-call summary provided via email by EPA on October 14, it appears that the EPA and Navy have different CSMs that likely account for the variance in timeframe estimations. Most notably, the Navy's evaluations assume the residual sources will continue to decay at a rate calibrated from an assumed release to present day (2007, 2009 and 2010 data sets) and downgradient portions decaying at the calibrated biodegradation rate (very slow, nearly similar to no decay).*

*Further evaluations of the timelines to reach the clean-up criteria will be performed when further updates to the FS are completed.*

**EPA Comment p 30, N.Resp.Cmt 71:** The comment does correspond to the text, but the point EPA was not as clear as it could have been. What EPA was attempting to represent is that if the storm sewer has permit limitations (particularly if it is a CSO) the Navy would need to meet pretreatment/discharge standards at the point where the Navy was discharging into the storm sewer, not at the Bay.

***Navy Response to EPA Comment p 30, N.Resp.Cmt 71:*** *Agree. Any discharge limitations would be based on the receiving water along with any considerations for the storm sewer. In any case, the distinction being made in the discussion of these process options in this section is direct discharge to surface water versus indirect discharges to a POTW.*

**EPA Comment p 31, N.Resp.Cmt 73:** On-site consolidation would not necessarily trigger landfill and on-site disposal facility regulations any more than cover/capping the waste in place. For instance, consolidation could be done under risk-based standards under the R.I. Remediation Regulations, if appropriate.

***Navy Response to EPA Comment p 31, N.Resp.Cmt 73:*** *Disagree. The NCA area is being evaluated as contaminated soil, not as a landfill. Therefore, the site cover alternatives include sufficient soil thickness to prevent exposure to contaminated soil. LUCs would be implemented to maintain the integrity of the cover. If this contaminated soil was moved and consolidated, the soil most likely would need to be managed as a solid waste. Many of the solid waste landfill regulations would be ARARs for the closure and long-term maintenance and monitoring of the consolidated contaminated soil. Use and development of the consolidated soil would be restricted compared to the rest of the site. For example, slopes and drainage features of the consolidated soil pile could not be readily modified. Construction on top of the consolidated soil pile may be limited by the engineering properties (such as bearing capacity) of the pile. Finally, the elevation of a consolidated pile would be significantly higher than the existing grades and would affect the aesthetic character of the area.*

**EPA Comment p 32, N.Resp.Cmt 85:** Unclear what the subject of the last paragraph (transfer of properties) has to do with the section, which describes what the selected alternatives are (not how they apply to different land uses within the operable unit).

***Navy Response to Comment p 32, N.Resp.Cmt 85:*** *The paragraph was provided for informational purposes for the reader. The paragraph will be deleted.*

**EPA Comment p 32, N.Resp.Cmt 86:** The No Action Alternative only pertains to CERCLA actions, not outside land use controls that are not incorporated into the CERCLA remedy. The purpose of the No Action Alternative is to compare taking no CERCLA remedial action (other than 5-year reviews) compared with other CERCLA remedial alternatives. For instance under a CERCLA No Action Alternative an active petroleum remediation under State authority could be occurring within an operable unit, but that would have no relevance in the FS to comparing the No Action Alternative to other CERLCA remedial alternatives. The assumption that land use controls managed by previous property transfer agreements will stay in place indefinitely does not appear to be a valid. While the No Action Alternative does not include the elimination of these controls, there is not any requirement under this alternative that they will remain either. Therefore, the statement that the LUCs will "remain in place" does not appear to be appropriate. The text should be clarified to reflect this uncertainty, or reference to the existing LUCs removed.

***Navy Response to Comment p 32, N.Resp.Cmt 86:*** *The discussion of the existing land use controls will be kept in the text. The text will be revised to note that there is uncertainty about the permanence of these controls because they are not environmental land use controls that have been implemented by a ROD.*

**EPA Comment p 33, N.Resp.Cmt 88:** In this section remove both the second and fourth sentences since neither existing non-CERCLA land use restrictions no natural attenuation have any relevance to the No Action Alternative, since neither is a remedial component of the alternative.

***Navy Response to EPA Comment p 33, N.Resp.Cmt 88:*** *The two sentences should be left in. The existing land use controls will provide protection, although, as noted, there is uncertainty about their permanence and that can be noted. The effects of natural attenuation can still be noted because even with no action, these processes will still occur.*

**EPA Comment p 33, N.Resp.Cmt 89:** Remove the sentence – the only subject that should be discussed regarding meeting NCP standards for this criterion is whether the alternative includes active treatment as a component of the CERCLA remedy, which the No Action Alternative does not.

***Navy Response to EPA Comment p 33, N.Resp.Cmt 89:*** *Agree. The last sentence regarding COC reduction through natural attenuation will be deleted.*

**EPA Comment p 33, N.Resp.Cmt 94:** Remove the second sentence since capping is not "treatment" under this criterion. The statement regarding generation of investigation derived waste does not seem pertinent to the section. EPA's request for removing this sentence appears to be appropriate.

***Navy Response to EPA Comment p 33, N.Resp.Cmt 94:*** *Agree. Because IDW is not a residual generated by treatment, the sentence will be deleted.*

**EPA Comment p 34, N.Resp.Cmt 95:** Based on the Navy's response, change the first sentence to: "Overall, the sustainability impact of Alternative S-2 is low to moderate based on sustainability analysis using SiteWise™ (see Appendix H)."

***Navy Response to EPA Comment p 34, N.Resp.Cmt 95:*** *Agree. The sentence will be revised as suggested.*

**EPA Comment p 34, N.Resp.Cmt 95A:** Appendix H, Sustainable Evaluation of Remedial Alternatives: EPA did not complete a detailed technical evaluation of the analysis presented in Appendix H. In general, EPA supports Navy's efforts to evaluate the sustainability of planned remediation efforts and identify opportunities to mitigate environmental impacts of the remediation. EPA agrees that these considerations can be evaluated under the short-term effectiveness criteria. In addition, EPA agrees with Navy's statements to others that "(t)he results presented ...are provided with the intention of giving more information in order to make a more intelligent decision on which treatment to use". Further, EPA suggests that a valuable use of the results presented here will be in the design of the selected remedy to ensure that the drivers of any significant impacts are considered and that those environmental impacts are mitigated to the extent practicable. The Navy's efforts should be consistent with EPA Region 1's Clean and Green Policy issued on February 18, 2010 (http://www.clu-in.org/greenremediation/docs/R1GRPolicy.pdf). In addition, EPA has developed a number of Green Remediation Fact Sheets that provide best management practices (BMPs) for a number of common remediation processes. Navy should consider these as they move forward with the remediation of the NUSC site: excavation and surface restoration (http://www.clu-in.org/greenremediation/docs/GR_Quick_Ref_FS_exc_rest.pdf), bio-remediation (http://www.clu-in.org/greenremediation/docs/GR_factsheet_biorem_32410.pdf), and clean fuel and emission technology (http://www.clu-in.org/greenremediation/docs/Clean_FuelEmis_GR_fact_sheet_8-31-10.pdf). Review of these BMP fact sheets may provide additional recommendations for reducing the environmental footprint of the remedies that could be added to the Recommendations Section of this analysis.

***Navy Response to EPA Comment p 34, N.Resp.Cmt 95A:*** *Comment acknowledged.*

**EPA Comment p 34, N.Resp.Cmt 96:** The backfill is a cover in all locations where the subsurface soil under the cover poses a CERCLA risk to unlimited use. Note that groundwater monitoring at the compliance boundary of any area where waste is left in place would be required under waste

management ARARs standards even if there was no current groundwater risk requiring a CERCLA groundwater remedy.

***Navy Response to EPA Comment p 34, N.Resp.Cmt 96:*** *Comment acknowledged. Compliance boundary monitoring would be part of the groundwater monitoring in the groundwater alternatives.*

**EPA Comment p 34, N.Resp.Cmt 97:** Lead at this site is not naturally occurring. The comment refers to the statement in the sentence that the lead does not pose a CERCLA risk – this is only true if the lead does not pose a risk to unlimited use. Only the pounds of lead that pose a risk should be included in the calculation of contaminants removed under the alternative.

***Navy Response to EPA Comment p 34, N.Resp.Cmt 97:*** *The mass of lead is estimated based on the areas where lead concentrations are greater than the PRG for lead. Lead in other areas that are being excavated but where there is no risk from lead has not been included. All of the lead in a given area being excavated because of the lead is included. No effort has been made to exclude the lead that is present at concentrations less than or equal to the PRG. The estimate of the mass of the each of the other COCs was calculated in a similar fashion. All of the mass of the COC in the soil is estimated, not just the mass greater than the PRG. No revision in the estimate of the lead is proposed.*

**EPA Comment p 35, N.Resp.Cmt 100 & 107:** See EPA's response to N.Resp.Cmt. 93.

***Navy Response to Comment p 35, N.Resp.Cmt 100 & 107:*** *Comment acknowledged. However, please note that there was no follow-up comment to Comment 97 in EPA's September 26, 2011 comment letter. ARARs for the cover are based on RIDEM Remediation Regulations. Potential leachability impacts would be addressed by monitoring, per comment 2 above.*

**EPA Comment p 35, N.Resp.Cmt 101, 108, and 112:** See EPA's response to N.Resp.Cmt. 95.

***Navy Response to EPA Comment p 35, N.Resp.Cmt 101, 108, and 112:*** *Comment acknowledged. The text will be revised per the response to Comment 95.*

**EPA Comment p 35, N.Resp.Cmt 103:** If the presence of co-mingled TPH with the CERCLA waste results in higher remedial costs, that added cost for addressing the TPH should not be included in the analysis.

***Navy Response to EPA Comment p 35, N.Resp.Cmt 103:*** *The additional cost associated with the TPH has been noted. The additional cost is approximately 3 percent of the capital cost. This small percentage*

*has no effect on the evaluation of the alternative. No revisions to the capital cost calculation are proposed. Note that the TPH contamination is typically co-located/adjacent to PAH contamination; the remediation cannot be practically separated.*

**EPA Comment p 35, N.Resp.Cmt 104:** See EPA's response to N.Resp.Cmt 96.

***Navy Response to EPA Comment p 35, N.Resp.Cmt 104:*** *Comment acknowledged. See the response to Comment 96.*

**EPA Comment p 35, N.Resp.Cmt 105:** See EPA's response to N.Resp.Cmt 97.

***Navy Response to EPA Comment p 35, N.Resp.Cmt 105:*** *See response to Comment* 97. *No change in the estimate of the lead is proposed.*

**EPA Comment p 36, N.Resp.Cmt 110 and 113:** See EPA's response to N.Resp.Cmt 103.

***Navy Response to EPA Comment p 36, N.Resp.Cmt 110 and 113:*** *Per the response to Comment 103, the additional cost associated with the TPH has been noted. The additional cost is approximately 3 percent of the capital cost for Alternative S-4 and approximately 0.5 percent of the capital cost for Alternative S-5. No revisions to the capital cost calculation are proposed.*

**EPA Comment p 37, N.Resp.Cmt 114, 116, 117, 121, 122, 125:** See EPA's response to N.Resp.Cmt. 68. A reasonable time for an MNA needs to be compared to active remedies. Outside of any waste management area compliance zone established under the soil alternatives groundwater needs to meet drinking water standards through MNA within a time period comparable to active treatment alternatives. It does not matter that groundwater is currently not being used as a potable water supply (see EPA groundwater remediation guidance).

***Navy Response to EPA Comment p 37, N.Resp.Cmt 114, 116, 117, 121, 122, 125:*** *Refer to response to Comment 68 above. In addition, because of the absence of current groundwater use and the low probability of groundwater use in the future, a short timeframe for remediation is not necessary.*

**EPA Comment p 37, N.Resp.Cmt 115:** See EPA's response to N.Resp.Cmts 86, 88, and 89.

***Navy Response to EPA p 37, N.Resp.Cmt 115:*** *These are No Action alternative comments. Please see the replies to comments 86, 88, and 89 above.*

**EPA Comment p 38, N.Resp.Cmt 118:** See EPA's response to N.Resp.Cmt regarding the Table 2 ARARs. The revised alternative-specific ARARs tables needs to be provided for EPA to fully comment on.

***Navy Response to EPA Comment p 38, N.Resp.Cmt 118:*** *Comment acknowledged. However, please note that the alternative-specific tables have already been provided and EPA has submitted comments on those tables. The reviewer's indication that the EPA will more "fully comment" (again) on the ARARs tables is unfortunate. This approach suggests an "open ended "response-to-comments" process and is not conducive to completing the FS in a timely manner. (This approach is also at variance with the FFA.)*

**EPA Comment p 38, N.Resp.Cmt 119:** The text for the TBC risk guidances Action to Be Taken should state that the No Action Alternative will not meet risks calculated using the guidances. Based on standards for other CERCLA sites in the Region, if PCBs exceed 1 ppm they require remedial action under TSCA's risk-based standards.

***Navy Response to EPA Comment p 38, N.Resp.Cmt 119:*** *Additional text for the no action alternative can be added to note that there would still be unacceptable risks. Disagree that TSCA regulations should be included. PCBs were not identified as COCs, so TSCA regulations cannot be ARARs.*

**EPA Comment p 38, N.Resp.Cmt 120:** See EPA's response to N.Resp.Cmts. 41 (regarding both MCLGs and EPA's Health Advisory) and 119.

***Navy Response to EPA Comment p 38, N.Resp.Cmt 120:*** *See response to Comment 41 regarding MCLGs and Health Advisories.*

**EPA p 39, N.Resp.Cmt 123:** EPA will need to review the revised Section 5.0 to determine if the Navy has incorporated all of the issues raised in EPA's responses to the Navy's Response to Comments. The compliance zone around the potential waste management area needs to be delineated to determine where groundwater (outside of the compliance zone and outside of areas with saline groundwater) requires treatment.

***Navy Response to EPA p 39, N.Resp.Cmt 123:*** *Comment acknowledged.*

**EPA p 39, N.Resp.Cmt 124:** EPA will need to review the revised Tables to determine if the Navy has incorporated all of the issues raised in EPA's responses to the Navy's Response to Comments.

***Navy Response to EPA p 39, N.Resp.Cmt 124:*** *Comment acknowledged.*

**EPA Comment p 40, N.Resp.Cmt 126:** Note from previous EPA responses that groundwater treatment to federal drinking water standards is only required for groundwater outside of the compliance zone for any waste management area established and outside of any area with saline groundwater (if the groundwater poses a risk to ecological receptors in Allen Harbor, then some additional remediation in saline areas might be required).

***Navy Response to p 40, N.Resp.Cmt 126:*** *Comment acknowledged. Please also see response to Comment 2.*

**EPA Comment p 45, N.Resp.Cmt 131:** It was not EPA's intent to propose a two well approach to capture the contaminant plume down gradient of the former Building 41 area, but rather to question the rationale behind a remedy that requires 45 extraction wells. The equation used by EPA can be sourced from Figure 14 on page 21 of EPA publication 600/R-08/003 (rather than Figure 13 on page 20). As the written and diagrammatic definitions of the variables provided on Figure 14 indicate, Y is the capture zone width from central line of the plume, or half the full width of the capture zone. Thus, the full width (w) of the capture zone will equal 2 x Y. Figure 14 provides formulae for the capture width in terms of Y for both the maximum upgradient capture zone and the capture zone at the extraction well. It is correct that EPA's previous calculation provided the value of the capture width Y for the maximum capture zone rather than at the extraction well itself. If the capture zone immediately adjacent to the extraction well were considered, the total width of the capture zone would be 100.6 feet. It is correct that if the overburden aquifer were homogeneous with no impediments to vertical flow, it would be appropriate to use the full saturated thickness of the aquifer when computing capture zone widths. However, the stratigraphy observed at the site suggests significant hydraulic conductivity contrasts in the overburden that will likely influence the width of a capture zone created by an extraction well, particularly in the area immediately adjacent to the extraction well. While the hydraulic rationale underlying the design of the extraction system considered as a remedial alternative has not been clearly established in the FS, it appears that this design also relies on the screening of extraction wells over discrete depths in an apparent attempt to capture the contaminant plume at isolated depths in the overburden. Thus, the Navy also appears to intend to focus capture on discrete depths rather than the entire saturated overburden. Additional discussion and hydraulic analysis are necessary to justify the assumption that 45 extraction wells are necessary to contain the plume in Site 16 Area. Please schedule a technical meeting to discuss this and other groundwater alternative issue noted in these comments.

***Navy Response to EPA Comment p 45, N.Resp.Cmt 131:*** *Comment acknowledged. Appendix G.5 of the FS provides technical rationale for the spacing of the extraction wells within each targeted zone/depth based on site-specific responses observed during the Remedial Investigation. The Navy is encouraged that EPA acknowledges the complexity of the subsurface in this updated comment and agrees that the*

*well spacing is likely to be conservative. With the conservative approach based on site-specific information and targeted design, the number of anticipated extraction wells is higher than assuming homogeneous conditions with wells capturing groundwater over the entire saturated zone. Further justification is not necessary at this time as based on the conference call on October 18, this remedy is not likely to be selected.*

# ATTACHMENT A

# TELECONFERENCE NOTES

## Summary of Teleconferences Conducted Regarding Response to Comments (RTCs) for Revised Draft NCBC Davisville Site 16 Feasibility Study

**Summary of Conference Call with EPA: 10/12/11**

**Participants:**
**Christine Williams, EPA Region I**
**Dave Barney, Navy**
**Dave Peterson, EPA Region I**
**Lee Ann Sinagoga, Tetra Tech**
**Joe Logan, Tetra Tech**

Several Applicable or Relevant and Appropriate Requirements (ARAR)-related comments were discussed.

**Comment 41 – Maximum Contaminant Level Goals (MCLGs) and Health Advisory for Manganese.**

It is EPA's position that non-zero MCLGs are to be used and cited as ARARs. As long as the aquifer is classified as a potential drinking water source, then the MCLGs are relevant and appropriate (R&A). MCLGs equal to zero may be to-be-considered (TBC), but that decision would be made on a site-specific basis.

In the drinking water standards, there are only two contaminants with non-zero MCLGs less than the Safe Drinking Water Act (SDWA) maximum contaminant level (MCL). In all other cases, either then MCL is equal to the MCLG, or the MCLG is zero. In the Site 16 case, PCE, TCE, VC and benzene have MCLGs of zero. For cis-1,2-DCE, the MCL equals the MCLG. Thus, inclusion/exclusion of the MCLG as an ARAR has no effect on the approach presented in the Site 16 FS.

The use of the health advisory (HA) of 300 ug/L for manganese is being required by EPA throughout Region I. However, because the background value for groundwater at Site 16 is greater than the HA, the HA will not be used. At the Navy's request, EPA will research "why" the HA value is preferred over the current EPA risk-based regional screening level (RSL), which more closely follows the risk assessment procedures used in the RI. (See Attached E-mail dated 10.12.11.)

**Comment 42 – 500-year Floodplain Issue**

EPA continues to believe that a 500-year floodplain must be considered in alternative development and design. Joe Logan indicated that the 500-year floodplain is for "Critical Actions" as described by the

regulation. Although that definition includes areas with "toxic" materials, it does not appear likely that the low-level contamination at Site 16 is comparable to the other materials included in the definition ("highly volatile, flammable, explosive"). Further, TSDF siting only uses the 100-year floodplain, and a TSDF is expected to be more toxic than the Site 16 contaminated soil. However, these arguments did not alter the EPA opinion on this subject.

[A check of the FIRM shows that the 500-year floodplain is delineated. The 500-year floodplain takes in a large part of the NCA.]

**Comment 52 – Storm Drainage Regulation**

The only part of RIGL 45-61.1 that considers inspection is RIGL 45-61.1-2(b), and that is the portion of the regulation that will be cited. EPA did comment that only the substantive requirements need to be included in any case. However, for clarity, only the inspection section will be cited.

**Comment 119 – Toxic Substances Control Act (TSCA)**

According to EPA, the CERCLA remedy does not address the requirements of TSCA. Regardless of the CERCLA remedy, the EPA TSCA regulators must give their approval. Based on the discussion, this approval may simply be an administrative requirement for Site 16.

This discussion may be academic for Site 16. All of the PCB concentrations in soil are less than 1 ppm, so the TSCA citation is not needed.

**Summary of Conference Call with EPA: 10/18/11**

**Participants:**
**Christine Williams, EPA Region I**
**Bill Brandon, EPA Region I**
**Dave Barney, Navy**
**Jeff Dale, Navy**
**EPA Contractors: Andrew Glucksman, Rick Kuhthau**
**Lee Ann Sinagoga, Tetra Tech**
**Joe Logan, Tetra Tech**
**Scott Anderson, Tetra Tech**

This teleconference was held primarily to discuss the groundwater alternatives (and associated modeling) for the Site 16 FS. EPA forwarded comments on the subject to Navy on 10.14.11 (attached). The Navy and EPA are in disagreement regarding "how" the modeling was structured and used (in part) to estimate the time need to achieve MCLs. The EPA also believes that the size of the concentration contours used

throughout the alternatives evaluation has been over estimated by the Navy. As a result, the EPA believes that both remediation times and costs are overestimated. The Navy believes that, given the size of the CVOC plume and the long half-life of TCE, the concentration contours and time estimates to reach MCLs are appropriate. Given the size of the plume underlying Site 16, any remediation designed to achieve MCLs in "reasonably" short period of time will be very expensive. While the discussions did not result in agreement between EPA and Navy, they did allow both parties to more clearly understand each other's position and the EPA was more clearly informed regarding the inputs to the modeling and the manner in which the Navy ran the Biochlor model in support of the FS. The Navy is not proposing any changes to the plume maps or modeling in the forthcoming draft final FS. This issue is exemplified in E-mails (attached) between Ms. Williams and Mr. Dale:

**E-mail 10.17.11 from Mr. Dale to Ms. Williams:**

Christine

I appreciate your input, however we still disagree on some key issues regarding the TCE half life and the areas contemplated for active remediation.

I agree that Biochlor has some limitations, which we do identify in the FS; but the 14 year half life of TCE is based on the data and is a model input, not a modeled output. Therefore, in order to reach MCLs in 30 years, all groundwater and saturated soil would require immediate remediation to approximately 30 ug/L. On the other hand, if immediate remediation to the RI GB standard of 540 ug/L (as you suggest) were attained, the same 14 year half life of TCE would lead to approximately 100 years of MNA to reach the MCL. We can not adjust model inputs to change these results.

We also disagree with your repeated claims that we could reduce the areas targeted for active remediation by re-drawing the isoconcentration maps. The Navy RPM is responsible for programming, budgeting and implementing whatever remedy we agree to in the ROD. Therefore we stand by our plume maps, areas contemplated for remediation, and cost estimates. We could redraw targeted remedial areas to make the cost appear more palatable to the taxpayer; but then I as the RPM would not have viable cost estimates to support budget submissions to obtain the necessary funds that would actually be required to meet requirements set in a ROD.

I propose we set a time of 10:00 a.m. to 12:00 to talk tomorrow. Tetra tech will send call information.

Jeff

**E-mail 10.26.11 from Ms. Williams to Mr. Dale:**

I haven't followed up with my experts yet- but from what I remember from the call we discussed that we finally understood why you continued to use the 1ppm source term when you had already "cleaned up" the area. I also remember that we discussed that isn't how we believed the model should be run. I do believe this issue could be termed "agree to disagree" if Navy agreed to propose a source control remedy to GB within a reasonable timeframe at the bldg 41 & close proximity source areas (within the 1000 contour south of Davisville Rd) with MNA for the outlying

plume. I imagine I could craft something like this in a response letter after we see the perfluorenated compound data and get your (Navy's) verbal OK to our proposal as I note here.

As an additional note you'd mentioned that if I agreed to remove the P&T alternative you'd add our proposed alternative in, but that you didn't want to add another GW# to the FS- That we did talk about and sure go ahead and remove the P&T since you weren't using it for containment anyway. Although, you may want to add a containment remedy into the FS if the perfluorenated compounds are high enough to cause a risk in the future to the nearshore so that if we need it in the future we can issue an ESD rather than needing a ROD amendment.....

Regarding MNA, the Navy does believe that it is occurring, but, at a *very slow rate.*

Regarding the EPA's suggestion that DNAPL may exist at Site 16, please note that the Navy did investigate for DNAPL during the 2007 field investigation event. No evidence of DNAPL was found. While the Navy would agree that, potentially, small areas of DNAPL may be present (consistent with the Phase III RI), groundwater concentrations are below the 1 percent rule used to indicate that DNAPL is present.

The team also briefly discussed the potential migration of the CVOC plume to the waters of Allen Harbor. Mr. Bill Brandon (EPA), in particular, expressed this concern. Ms. Sinagoga replied that, in light of the on-going investigations at Sites 07/09, the Navy understands this concern. However, Site 16 is very different from Sites 07/09 in terms of source term concentrations and plume concentrations. While the CVOC concentrations in the Site 07/09 groundwater exceed 100,000 ug/L, the "worst case" concentrations at Site 16 do not exceed 10,000 ug/L (near Bldg 41). CVOC concentrations in wells immediately south of Allen Harbor do not exceed 1,200 ug/L (approximately). Limited CVOC concentrations have been detected in the surface water/sediments of Allen Harbor. There is no indication that the CVOC plume underlying Site 16 will impact biota of Allen Harbor (under current or future conditions). Ms. Williams agreed with these statements.

The EPA requested that an electronic copy of the soil/groundwater database for Site 16 be sent to the EPA for possible further data analysis.

## Sinagoga, Lee Ann

**From:** williams.christine@epamail.epa.gov
**Sent:** Wednesday, October 12, 2011 3:32 PM
**To:** Barney, David A CIV OASN (EI&E), BRAC PMO NE
**Cc:** Peterson.David@epamail.epa.gov; Dale, Jeffrey M CIV NAVFAC MIDLANT, EV; Logan, Joe; Sinagoga, Lee Ann; Sugatt.Rick@epamail.epa.gov
**Subject:** RE: Davisville call to discuss MCLGs as ARARs

Hi Dave- I have an answer on the Health Advisory vs RSL for manganese question from Rick Sugatt:

The current tapwater RSL for manganese is based on adult ingestion of drinking water, as are all tapwater RSLs. The EPA workgroup that updates the RSLs is going to change the tapwater ingestion RSLs so that they are based on child tapwater ingestion, rather than adult.
Therefore, the manganese RSL in the future will be approximately the same as the Health Advisory.

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"Sometimes leadership is planting trees under whose shade you'll never sit." Gov. Jennifer M. Granholm

From: "Barney, David A CIV OASN (EI&E), BRAC PMO NE" <david.a.barney@navy.mil>
To: Christine Williams/R1/USEPA/US@EPA, "Sinagoga, Lee Ann" <LeeAnn.Sinagoga@tetratech.com>
Cc: David Peterson/R1/USEPA/US@EPA, "Dale, Jeffrey M CIV NAVFAC MIDLANT, EV" <jeffrey.m.dale@navy.mil>, "Logan, Joe" <Joe.Logan@tetratech.com>
Date: 10/12/2011 09:39 AM

## Sinagoga, Lee Ann

**From:** Dale, Jeffrey M CIV NAVFAC MIDLANT, EV <jeffrey.m.dale@navy.mil>
**Sent:** Wednesday, November 09, 2011 10:12 AM
**To:** Sinagoga, Lee Ann
**Subject:** FW: Site 16 FS biochlor comment resolution?

Lee Ann

Forwarding original emails.

Jeff

-----Original Message-----
From: williams.christine@epamail.epa.gov [mailto:williams.christine@epamail.epa.gov]
Sent: Wednesday, October 26, 2011 14:25
To: Dale, Jeffrey M CIV NAVFAC MIDLANT, EV
Subject: Re: Site 16 FS biochlor comment resolution?

I haven't followed up with my experts yet- but from what I remember from the call we discussed that we finally understood why you continued to use the 1ppm source term when you had already "cleaned up" the area. I also remember that we discussed that isn't how we believed the model should be run. I do believe this issue could be termed "agree to disagree" if Navy agreed to propose a source control remedy to GB within a reasonable timeframe at the bldg 41 & close proximity source areas (within the 1000 contour south of Davisville Rd) with MNA for the outlying plume. I imagine I could craft something like this in a response letter after we see the perfluorenated compound data and get your (Navy's) verbal OK to our proposal as I note here.

As an additional note you'd mentioned that if I agreed to remove the P&T alternative you'd add our proposed alternative in, but that you didn't want to add another GW# to the FS- That we did talk about and sure go ahead and remove the P&T since you weren't using it for containment anyway. Although, you may want to add a containment remedy into the FS if the perfluorenated compounds are high enough to cause a risk in the future to the nearshore so that if we need it in the future we can issue an ESD rather than needing a ROD amendment.....

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"Sometimes leadership is planting trees under whose shade you'll never sit."
Gov. Jennifer M. Granholm

-----"Dale, Jeffrey M CIV NAVFAC MIDLANT, EV" <jeffrey.m.dale@navy.mil> wrote: -----

To: Christine Williams/R1/USEPA/US@EPA
From: "Dale, Jeffrey M CIV NAVFAC MIDLANT, EV" <jeffrey.m.dale@navy.mil>
Date: 10/26/2011 01:14PM
Subject: Site 16 FS biochlor comment resolution?

Christine

Did the EPA formulate an opinion on our use of "source area concentration" in Biochlor model runs for post remediation scenarios? I believe we were in agreement on the model runs where active treatment was not contemplated (MNA).

Thanks

Jeff

## Sinagoga, Lee Ann

**From:** Dale, Jeffrey M CIV NAVFAC MIDLANT, EV <jeffrey.m.dale@navy.mil>
**Sent:** Monday, October 17, 2011 10:27 AM
**To:** williams.christine@epamail.epa.gov
**Cc:** Brandon.Bill@epamail.epa.gov; glucksman@mabbett.com; rkuhlthau@cox.net; Larimore@mabbett.com; Olson.Bryan@epamail.epa.gov; Barney, David A CIV OASN (EI&E), BRAC PMO NE
**Subject:** RE: Davisville Site 16 prep for call on 10/18

Christine

I appreciate your input, however we still disagree on some key issues regarding the TCE half life and the areas contemplated for active remediation.

I agree that Biochlor has some limitations, which we do identify in the FS; but the 14 year half life of TCE is based on the data and is a model input, not a modeled output. Therefore, in order to reach MCLs in 30 years, all groundwater and saturated soil would require immediate remediation to approximately 30 ug/L. On the other hand, if immediate remediation to the RI GB standard of 540 ug/L (as you suggest) were attained, the same 14 year half life of TCE would lead to approximately 100 years of MNA to reach the MCL. We can not adjust model inputs to change these results.

We also disagree with your repeated claims that we could reduce the areas targeted for active remediation by re-drawing the isoconcentration maps. The Navy RPM is responsible for programming, budgeting and implementing whatever remedy we agree to in the ROD. Therefore we stand by our plume maps, areas contemplated for remediation, and cost estimates. We could redraw targeted remedial areas to make the cost appear more palatable to the taxpayer; but then I as the RPM would not have viable cost estimates to support budget submissions to obtain the necessary funds that would actually be required to meet requirements set in a ROD.

I propose we set a time of 10:00 a.m. to 12:00 to talk tomorrow. Tetra tech will send call information.

Jeff

-----Original Message-----
From: williams.christine@epamail.epa.gov [mailto:williams.christine@epamail.epa.gov]
Sent: Friday, October 14, 2011 16:39
To: Dale, Jeffrey M CIV NAVFAC MIDLANT, EV
Cc: Brandon.Bill@epamail.epa.gov; Barney, David A CIV OASN (EI&E), BRAC PMO NE; glucksman@mabbett.com; rkuhlthau@cox.net; Larimore@mabbett.com; Olson.Bryan@epamail.epa.gov
Subject: Re: Davisville Site 16 prep for call on 10/18

The results of our internal call are attached

(See attached file: Additional Technical Review Comments.docx)

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"Sometimes leadership is planting trees under whose shade you'll never sit." Gov. Jennifer M. Granholm

From: Christine Williams/R1/USEPA/US
To: "Dale, Jeffrey M CIV NAVFAC MIDLANT, EV" <jeffrey.m.dale@navy.mil>
Cc: Bill Brandon/R1/USEPA/US@EPA, "Barney, David A CIV OASN (EI&E), BRAC PMO NE" <david.a.barney@navy.mil>, glucksman@mabbett.com, rkuhlthau@cox.net, Larimore@mabbett.com, Bryan Olson/R1/USEPA/US@EPA
Date: 10/12/2011 04:30 PM
Subject:Re: Davisville Site 16 prep for call on 10/18

Jeff:

It sure would have been nice to have had both you and my contractor at the meeting or at the very least have a good phone connection. However, we'll have to try this again. We'd like to keep the call for the morning of the 18th. I won't have bullets to send out until Friday and my computer is being replaced in the afternoon, so hopefully I'll get all the pieces together by the morning for you.

As Bryan and I discussed with you the groundwater alternatives need to clearly call out a tangible reduction (TCE at the GB level within 2 injections or flushed by 20 years of P&T or some sort of agreeable interim step) prior to an MNA remedy at the source areas. Then a discussion of evaluating MNA with the BIOCLOR model throughout the plumes without a continuing source in that part of the aquifer. It seems to me that you can change the MNA evaluation to do this rather than keeping the source terms at such a high level that keeps the remedy costs/timeframes high. We believe we've made some substantial comments on the issues so far in the three (four?) FS comment letters we've already sent, but are trying to bulletize those along with some new insights bulleted by our new

support folks. I have a wordy memo now that we're trying to consolidate and clarify. We are not doing any modeling, just trying to understand what was done in the FS.

One issue we need to all agree on is the areas (geographic locations) that need this tangible reduction. As we've mentioned it seems that your 1000 ug/l contour levels may be too large. We may be able to live with smaller targeted areas which would reduce upfront costs of active treatment prior to MNA.

We also need to see the alternatives revised to include the waste management unit if that is what you're planning on doing.

I'm working at home tomorrow until 3, please feel to call me
(978-851-4860) if you want to discuss more.
Christine

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From: "Dale, Jeffrey M CIV NAVFAC MIDLANT, EV"
<jeffrey.m.dale@navy.mil>
To: Bill Brandon/R1/USEPA/US@EPA
Cc: Christine Williams/R1/USEPA/US@EPA, "Barney, David A CIV OASN (EI&E), BRAC PMO NE" <david.a.barney@navy.mil>
Date: 10/06/2011 09:56 AM
Subject:Davisville Site 16 prep for call on 10/18

Bill

I'm sorry the phone connection did not work out for me to participate in the Davisville call on 9/22. I'm informed that EPA was going to provide the Navy a primary list of concerns for the site 16 FS, along with the results of some of your modeling. If I'm correct, please let me know when we will have the information in order to prepare for the call on October 18th.
We need to have time to prepare figures and information to address these concerns. We will set up call logistics.

Jeff

**Additional Technical Review Comments**

**Revision 1 Feasibility Study Report**
**For IRP Site 16**
**Former Naval Construction Battalion Center**
**Davisville, Rhode Island**

## OVERVIEW

The active remedial alternatives for groundwater (G-3, G-4, G-5, and G-6) identified in Revision 1 of the Feasibility Study focus on remediating the source areas as well as the portion of the contaminant plume in groundwater contained within the 1,000 µg/l or 500 µg/l contours. While the reductions in contaminant concentrations expected to be achieved through the active remediation in each alternative is frequently unclear, monitored natural attenuation (MNA) appears to ultimately be relied on to achieve groundwater MCL and or PRGs throughout the plume. This approach generally results in potentially higher remediation costs and extended remediation times. Consideration should be given to focusing active remediation directly on the source (release) areas identified as Site 16, with less intense active remediation focused on the downgradient plume. It may be appropriate to evaluate such an approach with the goal of eliminating the source areas and reducing groundwater contaminant levels within the downgradient plume to RIDEM GB levels as quickly as possible. After achieving reduction to GB levels throughout the plume, it may be more reasonable to rely on MNA to achieve the remaining reductions in contaminant levels necessary to achieve MCLs and/or PRGs.

EPA has identified various issues related to the FS conclusions regarding sources and source control, specific remedial alternatives, and time frame and cost estimates. These issues also impact the validity or appropriateness of the BIOCHLOR modeling decisions and results. The major issues are summarized in the following list:

- Strong evidence of a DNAPL release implies that residual DNAPL likely remain in the source areas; reduction of any remaining residual DNAPL or adsorbed DNAPL constituents in the source areas should be the primary goal of any groundwater alternative, as this is likely the sustaining source contributing to the current groundwater plume. An MNA-only groundwater remedial approach is not appropriate for source areas containing such DNAPL and residual soil impacts.

- No estimates were provided for the reductions in contaminant concentrations that will be achieved through the active remedial components of Alternatives G-3 through G-6, nor a time frame for achieving these reductions.

- The reduction of CVOC concentrations in source areas and the downgradient plume has not been realistically modeled in the BIOCHLOR model for Alternatives G-3 through G-6. A constant input source of 500 µg/l or 1,000 µg/l was used for this exercise, when in reality source input will be minimized, leading to a more rapid time frame to achieve the MCLs/PRGs. Natural

attenuation was also applied to a plume without any apparent reduction in contaminant concentrations after active remediation.

- The contaminant mass and extent requiring treatment has been overestimated through the use of maximum values without consideration of lower more recent data or spatial averages, and incorrectly drawn iso-concentrations contours.

- The cumulative and respective impact of the different levels of "conservative" assumptions including the overestimate of contaminant mass and extent on cost estimates is unclear. However, costs for specific groundwater alternatives have increased from previous estimates (e.g. 260% for G-3 and G-4, and an undetermined amount for G-6).

- The goals and technical basis of alternatives G-3 through G-6 is at times unclear. Specific issues include:

    - Alternatives G-3 (enhanced bio) and G-4 (chem ox) feature similar delivery requirements using applications of chemical solutions of similar volumes and reliability. However, the application method chosen for both is different (direct push drill rig injection vs. permanent wells) resulting in larger costs for permanent well installation. It is unclear if this is approach is justified.

    - The intent of Alternative G-5 (pump and treat) is stated as hydraulic flushing of the plume. However, from a review of the conceptual design and subsurface data it is unclear if this is an appropriate method or if the design concept integrates this stated purpose.

    - Timeframes for cleanup using enhanced biodegradation (G-4 and G-6) to do not appear to consider the special geochemical conditions created by the injection of emulsified oil and do not account for the preferential partitioning of chlorinated solvents from the dissolved phase into the emulsified oil which may lead to a dramatic and rapid reduction of dissolved contaminant concentrations in groundwater and continued bleed out at lower concentrations over time.

- Rating of MNA parameters (geochemical data) collected on site and provided in Appendix B of FS provides very limited support for the conclusion that reductive dechlorination of CVOC contaminants is an active process throughout the majority of the site. With the exception of data collected of a limited area of the site (the undeveloped area where BTEX has been released), the data do not support the contention that geochemical conditions exits that would support reductive dechlorination of TCE and its daughter products throughout Site 16 to any meaningful extent.

- The modeling of natural attenuation using BIOCHLOR presented in Appendix E does not provide a reliable representation of the groundwater regime at Site 16 that is suitable for predicting reductions of CVOCs based on natural attenuation for the purpose of evaluating remedial alternatives for Site 16. This is due to the significant uncertainties inherent in the BIOCHLOR calibrations presented in Appendix E. These uncertainties result from a number of factors including the following:

    - No historic data is available between the early 1950's when the release if believed to have occurred and when groundwater quality data was first collected in 2004. These data are necessary to define the nature of the initial release, the initial concentration of the release to groundwater, the dissipation of the source with time, the concentrations of CVOCs and their daughter products throughout the aquifer that developed over time, and the evolution of geochemical conditions throughout the aquifer over time.

    - Recently obtained (2004 & 2007) groundwater quality data that define a highly variable spatial of pattern of CVOC concentrations extending from the source area in to the downgradient portions of the plume. Such spatial variability is inconsistent with the regular pattern of decreasing concentrations expected from such a release scenario and predicted by BIOCHLOR.

    - A large number of parameters are being manipulated in order to calibrate the model. These include groundwater flow rates, dispersion, initial source strength, source decay rates, and TCE decay rates. The data set that is available is insufficient to properly determine all of these parameters. Thus, with the limited data set currently available, it does not appear possible to determine through calibration a unique set of parameters that reliably represents the fate and transport of contaminants at Site 16.

    - The efforts to calibrate BIOCHLOR model using the various parameter sets and the 2004 or 2007 data yielded a poor match along the plume centerline, particularly at the distal end of the simulated flow path. Thus the BIOCHLOR calibrations are not adequate for reliably determining the necessary parameters for predicted future MNA.

- The BIOCHLOR model as presented does not adequately model cleanup times under the alternatives presented, is not reliably calibrated, and does not incorporate all of the issues identified regarding sources, or expected active remediation cleanup levels (i.e. what is the remaining source after treatment) and timeframes. As such the output of the model is not reliable enough to use for comparison of all groundwater alternatives.

**RECOMMENDATIONS**

EPA has provided numerous comments indicating that source control must be performed using active remedial strategies. Further, EPA is willing to consider achieving RIDEM GB standards as interim remediation goals in a reasonable time frame in selected source areas using active remediation, followed by a longer period for achievement of MCLs using MNA.

Rather than treat all groundwater above the 1,000 µg/L or 500 µg/L iso-concentration, use of selective source controls to remove the sources feeding these higher concentration areas may rapidly achieve the RIDEM GB standards in a cost effective manner that does not require the widespread treatment estimated in the FS.

Once Navy considers the technical issues outlined herein, the BIOCHLOR model should be re-run so that Navy and EPA can assess the time frames to achieve 0.5x and 1.0x RIDEM GB criteria using active remedial alternatives in the selected source areas. For distal portions of the groundwater plume, EPA is willing to consider an approach whereby MNA (where active remediation is also used for source reduction) is the sole remedial alternative used to achieve MCL/PRGs.

For EPA to consider this approach, we ask that Navy present first present BIOCHLOR model input parameters that may yield a supportable and reasonable output. EPA acknowledges that the use of the BIOCHLOR model for this particular site is difficult due to the previously discussed issues. Some of the issues are not possible to fully resolve (i.e. lack of historical time-series data). EPA believes a source reduction approach decreases the level of reliance on the BIOCHLOR model, as the resulting plume concentrations following source reduction measures would be greatly reduced, uncertainties regarding on-going source inputs minimized, and overall urgency of cleanup time frames is reduced in relation to the reduction achieved in meeting potential interim cleanup goals.

In summary, EPA recommends the following actions:

- Redefine the conceptual model for source area treatments (i.e. identify potential treatment areas based on weighing evidence from both soil and groundwater hotspots identified in the following figures):
    - Groundwater hotspots based on Figure 4-6, and
    - Soil hotspots based on Appendix I , Figures 8-2 through 8-9.
- Develop consensus on limits and levels for active treatment areas.
- Reevaluate active remedial alternatives for source control based on interim cleanup levels equivalent to RIDEM GB criteria for source areas.
- Run BIOCHLOR model to estimate new time frame to achieve 0.5x and 1x RIDEM GB criteria in source areas using active remedial alternatives, and to achieve MCLs/PRGs in distal portions of the plume using MNA.

# ATTACHMENT B

# BULLETED SUMMARY OF NEW ALTERNATIVES FOR SITE 16 FS

**NCBC DAVISVILLE – SITE 16**
**REVISED DRAFT FEASIBILITY STUDY**
**SUMMARY OF NEW ALTERNATIVES**
**11/9/11**

Additional soil and groundwater alternatives will be developed as described below. The new groundwater alternative is intended to dovetail into the new soil alternative.

Soil Alternative S-6

- The entire NCA would be covered with a soil cover such that the entire area would be considered as a waste management unit (WMU). The borders would generally be Allen Harbor and the marina on the north, Allens Harbor Road on the east, Davisville Road on the south, and Westcott Road on the west.
- The area to be covered is approximately 9.7 acres.
- Groundwater standards would not have to be met under the waste management unit and up to the point of compliance wells that would be placed near the edge of the cover. Federal and state regulations allow the point of compliance wells to be up to 150 meters from the waste management unit boundary. The WMU would extent north to the shoreline of Allen Harbor.
- The cover would consist of 1 foot of clean soil (6 inches of top soil over 6 inches of fill) overlying a geotextile liner.
- Contaminated soil near the marina building would be excavated and disposed off-site.

Groundwater Alternative G-3A

- Groundwater in the source area near former Building 41 would be treated by in-situ chemical oxidation. The targeted treatment volume would be defined by the 1,000 µg/L TCE concentration contours for the elevation intervals of 5 to -5 feet, -5 to -15 feet, -15 to -25 feet, and -25 to -35 feet. The deeper intervals (-35 to -45 feet and bedrock) are not being treated.
- This area of active treatment would have a milestone/interim remedial goal of the RIDEM GB criterion of 540 ug/L.
- The balance of the plume, outside of the WMU, would be remediated through natural attenuation. Monitoring of the WMU point of compliance wells would be incorporated into the MNA long-term monitoring plan.
- Land use controls via an ELUR would be enacted to prevent use and exposure to groundwater above MCLs, to specify the future buildings must be constructed so that vapor intrusion pathway

is mitigated, and to prevent exposure to contaminated shallow groundwater during construction activities.

# ATTACHMENT C

# "GOODNESS OF FIT" - ARSENIC

## Sinagoga, Lee Ann

**From:** Christian, Anna-Marie
**Sent:** Monday, October 24, 2011 4:09 PM
**To:** Sinagoga, Lee Ann
**Subject:** RE: Davisville Site 7 Response
**Attachments:** Arsenic Goodness of Fit Statistics.xls

Goodness of fit statistics were calculated for the arsenic concentrations using the USEPA software ProUCL (see attached). Based on the goodness of fit statistics calculated by ProUCL at a five percent significance level the background arsenic data follow a log normal distribution. Often in environmental applications, site concentrations are compared to background level contaminat concentrations, also called background threshold values. The Technical Guidance for USEPA's ProUCL version 4.1 recommends upper percentiles, upper prediction limits, upper tolerance limits, and IQR upper limits be used as not to exceed values (USEPA, May 2010). Therefore, for arsenic the upper prediction limit was calculated and used as the background value and subsequent PRG for arsenic.

**Anna-Marie Christian, MS Stat** | **Environmental Scientist III**
Direct: 412.921.8351 | Main: 412.921.8993 | Personal Fax: 412.921.4040
annamarie.christian@tetratech.com

Tetra Tech | Chemistry & Toxicology
661 Andersen Drive | Pittsburgh, PA 15220-2745 | www.tetratech.com



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**From:** Sinagoga, Lee Ann
**Sent:** Monday, October 24, 2011 3:56 PM
**To:** Christian, Anna-Marie
**Subject:** RE: Davisville Site 7 Response

Thank you.

---

**From:** Christian, Anna-Marie
**Sent:** Monday, October 24, 2011 1:03 PM
**To:** Sinagoga, Lee Ann
**Subject:** Davisville Site 7 Response

Lee Ann,

I've looked through several of EPA's background guidance documents and they focus on the hypothesis test comparisons for background determination. However ProUCL recommends the UPLs and several other statistics for use as a not to exceed background concentration. See if the response below provides enough information for a response

N. Response to Comment 32.

Often in environmental applications, site concentrations are compared to background level contaminat concentrations, also called background threshold values. The Technical Guidance for USEPA's ProUCL version 4.1 recommends upper percentiles, upper prediction limits, upper tolerance limits, and IQR upper limits be used as not to exceed values (USEPA, May 2010). Therefore, for arsenic the upper prediction limit was calculated and used as the background value and subsequent PRG for arsenic.

**Anna-Marie Christian, MS Stat** | **Environmental Scientist III**
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| | A | B | C | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | Goodness-of-Fit Test Statistics for Full Data Sets without Non-Detects | | | | | | | | |
| 2 | | | User Selected Options | | | | | | | | | |
| 3 | | | From File | H:\Davisville\Davisville Site 16 FS Appendices\Arsenic Background Data.wst | | | | | | | | |
| 4 | | | Full Precision | OFF | | | | | | | | |
| 5 | | | Confidence Coefficient | 0.95 | | | | | | | | |
| 6 | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | |
| 8 | AS Background Data | | | | | | | | | | | |
| 9 | | | | | | | | | | | | |
| 10 | | | Raw Statistics | | | | | | | | | |
| 11 | | | Number of Valid Observations | 7 | | | | | | | | |
| 12 | | | Number of Distinct Observations | 7 | | | | | | | | |
| 13 | | | Minimum | 0.59 | | | | | | | | |
| 14 | | | Maximum | 8.1 | | | | | | | | |
| 15 | | | Mean of Raw Data | 2.634 | | | | | | | | |
| 16 | | | Standard Deviation of Raw Data | 2.951 | | | | | | | | |
| 17 | | | Kstar | 0.779 | | | | | | | | |
| 18 | | | Mean of Log Transformed Data | 0.496 | | | | | | | | |
| 19 | | | Standard Deviation of Log Transformed Data | 0.994 | | | | | | | | |
| 20 | | | | | | | | | | | | |
| 21 | | | Normal Distribution Test Results | | | | | | | | | |
| 22 | | | | | | | | | | | | |
| 23 | | | Correlation Coefficient R | 0.847 | | | | | | | | |
| 24 | | | Shapiro Wilk Test Statistic | 0.718 | | | | | | | | |
| 25 | | | Shapiro Wilk Critical (0.95) Value | 0.803 | | | | | | | | |
| 26 | | | Approximate Shapiro Wilk P Value | 0.00562 | | | | | | | | |
| 27 | | | Lilliefors Test Statistic | 0.389 | | | | | | | | |
| 28 | | | Lilliefors Critical (0.95) Value | 0.335 | | | | | | | | |
| 29 | Data not Normal at (0.05) Significance Level | | | | | | | | | | | |
| 30 | | | | | | | | | | | | |
| 31 | | | Gamma Distribution Test Results | | | | | | | | | |
| 32 | | | | | | | | | | | | |
| 33 | | | Correlation Coefficient R | 0.959 | | | | | | | | |
| 34 | | | A-D Test Statistic | 0.837 | | | | | | | | |
| 35 | | | A-D Critical (0.95) Value | 0.725 | | | | | | | | |
| 36 | | | K-S Test Statistic | 0.359 | | | | | | | | |
| 37 | | | K-S Critical(0.95) Value | 0.319 | | | | | | | | |
| 38 | Data not Gamma Distributed at (0.05) Significance Level | | | | | | | | | | | |
| 39 | | | | | | | | | | | | |
| 40 | | | Lognormal Distribution Test Results | | | | | | | | | |
| 41 | | | | | | | | | | | | |
| 42 | | | Correlation Coefficient R | 0.917 | | | | | | | | |
| 43 | | | Shapiro Wilk Test Statistic | 0.835 | | | | | | | | |
| 44 | | | Shapiro Wilk Critical (0.95) Value | 0.803 | | | | | | | | |
| 45 | | | Approximate Shapiro Wilk P Value | 0.105 | | | | | | | | |
| 46 | | | Lilliefors Test Statistic | 0.307 | | | | | | | | |
| 47 | | | Lilliefors Critical (0.95) Value | 0.335 | | | | | | | | |
| 48 | Data appear Lognormal at (0.05) Significance Level | | | | | | | | | | | |

# ATTACHMENT D

# NAPHTHALENE PRG SUPPORTING INFORMATION

By: Scott Auble

Checked By: Zachary Dowdell

Approved By: Scott R Auble

## General Kd analysis for Napthalene

$k_d$ = saturated soils [ ]/saturated GW [ ] , co-located

$k_d = k_{oc} * f_{oc}$ where $k_{oc} = 1837$

$f_{oc}$, geomean, unsaturated, undeveloped = 0.4701%

therefore $k_d = (1837)(0.004701) = 8.64$

## Use site-specific co-located data to calculate kd:

**1.)** MW16-07: GW: 75 = 2.6 µg/L on 8/29/2007

Soils= SB16-28 = 12,000 µg/kg
SB16-007 = 14,000 µg/kg
MW16-07 = 620 µg/kg
Source2-2 = 3685.04 µg/kg
Source2-1 = 3366.92 µg/kg

$k_d$= 620/2.6 = 238.5 12000/2.6 = 4615
3500/2.6 = 1346 14000/2.6 = 5384.6

Geomean soils = 4190.6 $k_d$ = 4190.6/2.6 = 1611.8

**2.)** TW16-1125: GW = 13.5 ng/L = 0.0135 µg/L

Soils= SB16-53 = 77 µg/kg
28-SB-1D = 550 µg/kg

$k_d$= 77/0.0135 = 5704 550/0.0135 = 40741

**3.)** TW16-1105: GW = 420 ng/L = 0.420 µg/L

Soils = SB16-91 = 1900 µg/kg

$k_d$ = 1900/0.420 = 4524

4.) MW16-46: GW= 1150 ng/L = 1.150 µg/kg
Soils= SB16-046 = 670 µg/kg
SB16-063 = 18,000 µg/kg
SB16-096 = 1300 µg/kg

kd= 670/1.150 = 582.6 1300/1.15 = 1130
18000/1.150 = 15652

5.) MW16-45: GW= 0.25 µg/L
Soils= 28-SB-12 = 2300 µg/kg
TP16-ETP5 = 1100 µg/kg

kd= 2300/0.25 = 9200 1100/0.25 = 4400

Geomean of all kd = ~3500
AVE of all Kd = 7793

*Value of ~5000 observed at all co-located pairs.

**RISK ASSESSMENT SPREADSHEET - SOIL SCREENING LEVEL FOR MIGRATION FROM SOIL TO GROUNDWATER**

**SOURCE: U.S. EPA SOIL SCREENING GUIDANCE**

**SITE-SPECIFIC $K_D$**

Relevant Equation:

$$SSL = C_w\left[K_D + \frac{\theta_w + \theta_a \cdot H'}{\rho_b}\right]$$

| | | |
|---|---|---|
| Cw = : | Chemical Specific | Target soil leachate concentration (mg/L) |
| $K_D$ = : | 5000 | Soil-water partition coefficient (L/kg) |
| $\theta_W$ = : | 0.0702 | Water-filled soil porosity ($L_{water}/L_{soil}$) |
| $\theta_a$ = : | 0.32 | Air-filled soil porosity ($L_{air}/L_{soil}$) |
| $\rho_b$ = : | 1.59 | Dry soil bulk density (kg/L) |
| n = : | 0.39 | Soil porosity ($L_{pore}/L_{soil}$) |
| $\rho_s$ = : | 2.65 | Soil particle density (kg/L) |
| H' = : | Chemical Specific | Dimensionless Henry's law constant |

| Parameter | Cw mg/L | H' | Kd | DAF = 1 mg/kg | DAF = 20 mg/kg |
|---|---|---|---|---|---|
| Naphthalene | 0.00014 | 1.8E-02 | 5.0E+03 | 0.700 | 14 |

Massachusetts Department of ENVIRONMENTAL PROTECTION

technical update

# Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil

Updates: Section 2.3 *Guidance for Disposal Site Risk Characterization – In Support of the Massachusetts Contingency Plan* (1992)

## Discussion

Polycyclic Aromatic Hydrocarbons ("PAHs") are ubiquitous and consistently present in the environment and are typically formed during the incomplete burning of organic material including wood, coal, oil, gasoline and garbage. PAHs are also found in crude oil, coal tar, creosote and asphalt. Historically, PAHs have been associated with human activities such as cooking, heating homes and industries and fuel for operating automobiles, although low levels of PAHs are also present in the environment from natural sources, such as forest fires. Their presence in the environment at higher concentrations is an artifact of habitation and is due to the widespread practice of emptying fireplaces, stoves, boilers, garbage, etc. in rural and urban areas over the past several hundred years. As a result, it is very common to detect "background" levels of PAHs in soils. Metals are both naturally occurring and found in man-made materials (such as paint, fuel, fertilizers and pesticides) widely distributed in the environment. Naturally occurring metals present in wood and coal are often found concentrated in ash residue.

DEP has obtained background data from various sources documenting the concentrations of PAHs and metals in soil affected by human activities, particularly soil associated with wood ash and coal ash. These levels are representative of typical concentrations found in areas with fill material, *not* pristine conditions. DEP has also compiled background soil data for metals that are representative of undisturbed, natural conditions.

The identification of generic values for PAHs and metals in soil is intended to streamline the risk characterization process (310 CMR 40.0900) and determination of applicable Response Action Outcome Category (310 CMR 40.1000). Nothing in this Technical Update obviates the need to establish location-specific background conditions for other purposes, such as compliance with the anti-degradation provisions of the Massachusetts Contingency Plan ("MCP") described at 310 CMR 40.0032(3).

## Definition of Background (310 CMR 40.0006)

Background means those levels of oil and hazardous material that would exist in the absence of the disposal site of concern which are either:

(a) ubiquitous and consistently present in the environment at and in the vicinity of the disposal site of concern; and attributable to geologic or ecological conditions, or atmospheric deposition of industrial process or engine emissions;
(b) attributable to coal ash or wood ash associated with fill material;
(c) releases to groundwater from a public water supply system; or
(d) petroleum residues that are incidental to the normal operation of motor vehicles.

# Basis of the Background Levels for Soil

The background levels were selected following an analysis of several datasets, including:

Data (30-140 samples) collected to represent background at c.21E sites located in non-urban areas, gathered from a review of DEP files,
Site-specific background samples generated for locations in Worcester (68 samples) and Watertown (17 samples),
Data (750-1,000 samples) collected by Mass Highway Department as part of the Central Artery/Tunnel (CA/T) project and presented in a draft document *Background Soil Contaminant Assessment* (CDM, April 1996),
Data (590 natural soil samples from depths of 10 to 70 feet) collected by Haley & Aldrich, Inc. in the Boston Area
Preliminary data compiled by the Massachusetts Licensed Site professional Association from background data submitted by its members,
Published data (62 samples) from ENSR, Inc. from 3 New England locations, and
Generic background data published by the Agency for Toxic Substances and Disease Registry (ATSDR).

There is not one concentration of a chemical, of course, which can correctly be labeled ***the*** background level. Hundreds of years of human activities have only broadened the naturally occurring range of concentrations reported as "background", and this range is best thought of as a statistical distribution. In the evaluation of environmental contamination, we often select point values from the range of background levels, and consider these to be representative of background. The use of such point-value "background" levels is essentially a short-cut method that allows consideration of background in the absence of site-specific information. The intent of DEP policy is to protect public health while minimizing the routine site-specific determinations at sites in the statewide cleanup program.

**"Natural" Soil**

- Generally, the 90$^{th}$ percentile value from the MA DEP 1995 dataset was the point-value identified as background.
- In the absence of data in the MA DEP 1995 dataset, a lower percentile value from the CDM 1996 dataset was chosen as background.

**Soil Containing Fill Material**

- Generally, the 90$^{th}$ percentile value from the CDM 1996 dataset was point-value identified as background.
- In the absence of data in the CDM 1996 dataset, the 90$^{th}$ percentile value from the "natural" soil (MA DEP, 1995) dataset was chosen as background.

# Applicability of the Values Listed in Table 1

Table 1 presents two lists of background concentrations: one for use with natural soils, and the second for use with soils containing either coal ash or wood ash associated with fill material, or other material consistent with the regulatory definition of background. The list for use with natural soils may be compared to site soil concentrations with no site-specific justification. The use of the list for soil containing fill material must be accompanied by documentation that the soil at the site does, in fact, contain coal ash or wood ash associated with fill material (or other material consistent with the regulatory definition of background). Such documentation may include information about the site history, soil strata, physical evidence or visual observations (including microscopic).

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Elevated chemical concentrations and/or and urban setting are not, *per se*, sufficient evidence to justify use of the higher background levels.

## Comparison of Site Concentrations to the Background Levels for Soil

Section 2.3 of the DEP's *Guidance for Disposal Site Risk Characterization – In Support of the Massachusetts Contingency Plan* (1995) describes the use of DEP-published generic background values. If the site investigation indicates the presence of fill material in the soil, and *all* reported concentrations of an oil or hazardous material ("OHM") fall below the applicable value published in Table 1, then it may concluded that the OHM is present at background concentrations. In other words, the values published in Table 1 are to be compared to the maximum reported concentration at the site. This Technical Update does not modify or change this comparison.

Table 1 lists background levels for "natural" soil and for soil containing coal ash and wood ash associated with fill material. A detailed summary of the data is attached in Appendix A. The applicability of these background concentrations to a site should be determined based upon the presence or absence of fill material containing coal ash or wood ash. If all contaminant concentrations are found to be equal to or less than the applicable background concentrations, a Class A-1 Response Action Outcome may be an option at the site, and no Activity and Use Limitation is required.

## Background Concentrations Different Than The MADEP-Published Values

Appendix A describes the wide ranges seen in the distributions of background concentrations. MADEP's choice of point values within these ranges balances the need to eliminate background chemicals from the risk assessment with the need to retain for evaluation those chemicals whose presence is related to the disposal practices at the site.

It is inevitable that at some sites the use of the values listed in Table 1 will incorrectly require the assessment of some "true" background concentrations of OHM at the high end of the background range. Conversely, some chemicals that *are* related to the disposal practices at a site (and are not background) will be screened out of the risk assessment by the use of the Table 1 concentrations. The goal is to minimize **both** kinds of error.

In many cases, additional information about the location of the site, the nature of the soils or the known or suspected disposal practices may be used to justify the application of different literature values or site-specific background information. DEP's adoption of the generic, statewide values presented in this Technical Update does not negate the validity of site-specific background information, when such information is available and of appropriate data quality. The level of effort necessary for such a justification will depend on the specific circumstances. For example, such a justification would be straightforward for elevated arsenic concentrations in soil at a gasoline-release site in an area of the state known to have geological formations rich in arsenic. The level of effort would be significantly higher at a tannery site in the same area due to the facility's historic use of arsenic. Similarly, the presence of elevated chromium or barium concentrations in marine clay deposits could generally be attributable to natural background absent known or suspected sources of the chemical at the site.

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## Minimizing Exposure to Soils Containing Elevated Background Material and/or Material Exempt from M.G.L. c.21E

As discussed in this Technical Update, M.G.L. Chapter 21E and the Massachusetts Contingency Plan (the statute and regulations) do not require remediation of chemicals present at levels consistent with background, even if such concentrations would otherwise pose a significant risk of harm to health, safety, public welfare or the environment. The statute also exempts several other environmental conditions (such as lead from lead paint or gasoline and pesticides applied according to their label) that could pose a Significant Risk.

While such conditions are not subject to regulation by DEP, the Department encourages parties to mitigate potential exposures whenever possible. Such mitigation measures could include:

- providing clean soil (down to a depth of 3 feet) in residential settings, and
- providing clean corridors for utility lines.

## For Further Information

For further information about this Technical Update, please contact Paul W. Locke, Massachusetts Department of Environmental Protection, One Winter Street, Boston, MA 02108, telephone: (617) 556-1052, email: Paul.Locke@state.ma.us.

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Table 1.

**MADEP Identified Background Levels in Soil**

| OIL OR HAZARDOUS MATERIAL | Concentration in "Natural" Soil mg/kg | Concentration in Soil Containing Coal Ash or Wood Ash Associated With Fill Material mg/kg |
|---|---|---|
| ACENAPHTHENE[2] | 0.5 | 2 |
| ACENAPHTHYLENE[2] | 0.5 | 1 |
| ANTHRACENE[2] | 1 | 4 |
| ALUMINUM[1] | 10,000 | 10,000 |
| ANTIMONY | 1 | 7 |
| ARSENIC | 20 | 20 |
| BARIUM[1] | 50 | 50 |
| BENZO(a)ANTHRACENE[2] | 2 | 9 |
| BENZO(a)PYRENE[2] | 2 | 7 |
| BENZO(b)FLUORANTHENE[2] | 2 | 8 |
| BENZO(g,h,i)PERYLENE[2] | 1 | 3 |
| BENZO(k)FLUORANTHENE[2] | 1 | 4 |
| BERYLLIUM | 0.4 | 0.9 |
| CADMIUM | 2 | 3 |
| CHROMIUM (TOTAL) | 30 | 40 |
| CHROMIUM(III) | 30 | 40 |
| CHROMIUM(VI) | 30 | 40 |
| CHRYSENE[2] | 2 | 7 |
| COBALT[1] | 4 | 4 |
| COPPER | 40 | 200 |
| DIBENZO(a,h)ANTHRACENE[2] | 0.5 | 1 |
| FLUORANTHENE[2] | 4 | 10 |
| FLUORENE[2] | 1 | 2 |
| INDENO(1,2,3-cd)PYRENE[2] | 1 | 3 |
| IRON[1] | 20,000 | 20,000 |
| LEAD | 100 | 600 |
| MAGNESIUM[1] | 5,000 | 5,000 |
| MANGANESE[1] | 300 | 300 |
| MERCURY | 0.3 | 1 |
| METHYLNAPHTHALENE, 2-[2] | 0.5 | 1 |
| NAPHTHALENE[2] | 0.5 | 1 |
| NICKEL | 20 | 30 |
| PHENANTHRENE[2] | 3 | 20 |
| PYRENE[2] | 4 | 20 |
| SELENIUM | 0.5 | 1 |
| SILVER | 0.6 | 5 |
| THALLIUM | 0.6 | 5 |
| VANADIUM[1] | 30 | 30 |
| ZINC | 100 | 300 |

(Values rounded to one significant figure.)

[1] In the absence of fill-specific data, the "natural" soil value has been adopted.

[2] In the absence of data specific to "natural" soil, a lower percentile value from the fill data set has been adopted.

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# Levels of PAHs and Metals in Soil from Various Datasets
## Appendix A - Detailed Data Summary

| | Number of Samples | Geometric Mean or Median mg/kg | Minimum mg/kg | 50th mg/kg | 90th mg/kg | 95th mg/kg | Maximum mg/kg |
|---|---|---|---|---|---|---|---|
| | | | <---------- PERCENTILES ----------> | | | | |
| **Total PAHs** | | | | | | | |
| **CA/T Project** | 873 | 2.7 | 0.08 | 2.6 | 92 | 230 | 3000 |
| **ENSR - Urban Soils** | 62 | 10.97 | 2.292 | | | | 167 |
| **Total Carcingenic PAHs** | | | | | | | |
| **CA/T Project** | 873 | 1.5 | 0.022 | 1.1 | 42 | 95 | 1200 |
| **ENSR - Urban Soils** | 62 | 4.86 | 0.68 | | | | 78 |
| **Total Noncarcinogenic PAHs** | | | | | | | |
| **CA/T Project** | 873 | 1.9 | 0.08 | 1.6 | 54 | 140 | 1900 |
| **ENSR - Urban Soils** | 62 | 6.11 | 1.612 | | | | 89 |
| **Acenaphthene** | | | | | | | |
| **CA/T Project** | 868 | 0.18 | 0.024 | 0.18 | 1.9 | 4.1 | 42 |
| **Med City/Mill Brook** | 67 | NC | ND (64) | NC | NC | NC | 1.7 |
| **ENSR - Urban Soils** | 62 | 0.128 | ND (32) | | | | 3.4 |
| **Acenaphthylene** | | | | | | | |
| **CA/T Project** | 869 | 0.17 | 0.037 | 0.17 | 1 | 1.9 | 10 |
| **Med City/Mill Brook** | 67 | NC | ND (65) | NC | NC | NC | 0.76 |
| **ENSR - Urban Soils** | 62 | 0.133 | ND (38) | | | | 1.1 |
| **Anthracene** | | | | | | | |
| **CA/T Project** | 872 | 0.2 | 0.033 | 0.2 | 3.8 | 10 | 130 |
| **Med City/Mill Brook** | 68 | NC | ND (52) | NC | 0.592 | 1.2 | 3.4 |
| **ENSR - Urban Soils** | 62 | 0.184 | ND (8) | | | | 5.7 |
| **Benzo[a]pyrene** | | | | | | | |
| **CA/T Project** | 873 | 0.3 | 0.031 | 0.3 | 7.4 | 17 | 230 |
| **LSPA Project** | 489 | 0.44 | ND (220) | 0.44 | 15.3 | NC | 222 |
| **Watertown** | 17 | 0.95 | 0.6 | NC | 3.39 | 4.77 | 6.08 |
| **Med City/Mill Brook** | 67 | NC | ND (43) | NC | 2.02 | 3.3 | 9.7 |
| **ENSR - Urban Soils** | 62 | 0.686 | ND (5) | | | | 13 |
| **ATSDR Range:** | | | 0.165 | | | | 0.22 |
| **Benzo[a]anthracene** | | | | | | | |
| **CA/T Project** | 872 | 0.33 | 0.045 | 0.33 | 8.5 | 19 | 250 |
| **LSPA Project** | 490 | 0.563 | ND (206) | 0.563 | 17.6 | NC | 796 |
| **Watertown** | 17 | 0.411 | 0.021 | 0.48 | 2.52 | 6.04 | 6.05 |
| **Med City/Mill Brook** | 68 | NC | ND (38) | NC | 2.39 | 3.8 | 15 |
| **ENSR - Urban Soils** | 62 | 0.672 | ND (4) | | | | 15 |
| **ATSDR Range:** | | | 0.169 | | | | 59 |
| **Benzo[b]fluoranthene** | | | | | | | |
| **CA/T Project** | 873 | 0.68 | 0.045 | 0.4 | 8.4 | 18 | 270 |
| **LSPA Project** | 486 | NC | ND (258) | NC | 11 | NC | 250 |
| **Watertown** | 17 | 1.4 | 0.6 | 0.6 | 6.78 | 6.79 | 7.08 |
| **ENSR - Urban Soil** | 62 | 0.722 | ND (7) | | | | 12 |
| **ATSDR Range:** | | | 15 | | | | 62 |

# Levels of PAHs and Metals in Soil from Various Datasets
## Appendix A - Detailed Data Summary

| | Number of Samples | Geometric Mean or Median mg/kg | Minimum mg/kg | 50th mg/kg | 90th mg/kg | 95th mg/kg | Maximum mg/kg |
|---|---|---|---|---|---|---|---|
| | | | <---------- PERCENTILES ----------> | | | | |
| **Benzo[g,h,i]perylene** | | | | | | | |
| CA/T Project | 871 | 0.2 | 0.045 | 0.2 | 3.1 | 7.7 | 77 |
| Med City/Mill Brook | 67 | NC | ND (52) | NC | 1.2 | 1.41 | 5.2 |
| ENSR - Urban Soil | 62 | 0.461 | ND (26) | | | | 5.9 |
| ATSDR Range: | | | 0.9 | | | | 47 |
| **Benzo[k]fluoranthene** | | | | | | | |
| CA/T Project | 869 | 0.21 | 0.045 | 0.21 | 4 | 9.7 | 150 |
| LSPA Project | 475 | NC | ND (289) | NC | 11.4 | NC | 110 |
| Watertown | 17 | 0.502 | 0.065 | 0.406 | 3.35 | 4.47 | 5.13 |
| ENSR - Urban Soil | 62 | 0.834 | ND (3) | | | | 25 |
| ATSDR Range: | | | 0.3 | | | | 26 |
| **Chrysene** | | | | | | | |
| CA/T Project | 873 | 0.35 | 0.022 | 0.35 | 7.3 | 18 | 240 |
| LSPA Project | 490 | 0.59 | ND (204) | 0.59 | 20.3 | NC | 420 |
| Watertown | 17 | 0.32 | 0.016 | 0.404 | 4.55 | 5.06 | 6.6 |
| Med City/Mill Brook | 68 | NC | ND (42) | NC | 2.1 | 3.6 | 14 |
| ENSR - Urban Soil | 62 | 0.844 | ND (2) | | | | 21 |
| ATSDR Range: | | | 0.251 | | | | 0.64 |
| **Dibenzo[a,h]anthracene** | | | | | | | |
| CA/T Project | 866 | 0.17 | 0.045 | 0.17 | 1.1 | 2.1 | 39 |
| Watertown | 17 | 0.195 | 0.155 | NC | 0.494 | 0.604 | 0.64 |
| Med City/Mill Brook | 68 | NC | ND (65) | NC | NC | NC | 1.6 |
| ENSR - Urban Soils | 62 | 0.245 | ND (30) | | | | 2.9 |
| **Fluoranthene** | | | | | | | |
| CA/T Project | 873 | 0.89 | 0.035 | 0.61 | 14 | 33 | 490 |
| Med City/Mill Brook | 68 | NC | ND (32) | 0.376 | 4.2 | 11 | 40 |
| ENSR - Urban Soils | 62 | 1.38 | ND (2) | | | | 39 |
| ATSDR Range: | | | 0.2 | | | | 166 |
| **Fluorene** | | | | | | | |
| CA/T Project | 873 | 0.18 | 0.028 | 0.18 | 2.3 | 5.5 | 79 |
| Med City/Mill Brook | 68 | NC | ND (65) | NC | NC | NC | 2 |
| ENSR - Urban Soils | 62 | 0.141 | ND (27) | | | | 3.3 |
| **Indeno[1,2,3-cd]pyrene** | | | | | | | |
| CA/T Project | 871 | 0.2 | 0.022 | 0.2 | 2.8 | 7 | 100 |
| LSPA Project | 475 | NC | ND (304) | NC | 6.3 | NC | 130 |
| Watertown | 17 | 1.752 | 1.2 | NC | 5.64 | 6.2 | 7.2 |
| Med City/Mill Brook | 68 | NC | ND (50) | NC | 1.5 | 2 | 6 |
| ENSR - Urban Soil | 62 | 0.532 | ND (19) | | | | 6 |
| ATSDR Range: | | | 8 | | | | 61 |
| **2-Methylnaphthalene** | | | | | | | |
| CA/T Project | 789 | 0.15 | 0.03 | 0.15 | 0.96 | 2.2 | 13 |
| Med City/Mill Brook | 68 | | ND (67) | NC | NC | NC | 0.77 |
| ENSR - Urban Soil | 62 | 0.121 | ND (43) | | | | 0.64 |

# Levels of PAHs and Metals in Soil from Various Datasets
## Appendix A - Detailed Data Summary

| | | Number of Samples | Geometric Mean or Median mg/kg | Minimum mg/kg | 50th mg/kg | 90th mg/kg | 95th mg/kg | Maximum mg/kg |
|---|---|---|---|---|---|---|---|---|
| | | | | <---------- PERCENTILES ----------> | | | | |
| **Naphthalene** | | | | | | | | |
| | **CA/T Project** | 867 | 0.17 | 0.016 | 0.17 | 1.4 | 3 | 28 |
| | **Med City/Mill Brook** | 68 | NC | ND (65) | NC | NC | NC | 1.9 |
| | **ENSR - Urban Soils** | 62 | 0.0917 | ND (27) | | | | 0.66 |
| **Phenanthrene** | | | | | | | | |
| | **CA/T Project** | 873 | 0.8 | 0.029 | 0.47 | 15 | 38 | 480 |
| | **Med City/Mill Brook** | 68 | NC | ND (38) | NC | 2.7 | 5.6 | 16 |
| | **ENSR - Urban Soils** | 62 | 0.788 | ND (1) | | | | 36 |
| **Pyrene** | | | | | | | | |
| | **CA/T Project** | 873 | 0.89 | 0.034 | 0.61 | 16 | 35 | 440 |
| | **Med City/Mill Brook** | 68 | NC | ND (32) | 0.343 | 4.29 | 9 | 30 |
| | **ENSR - Urban Soil** | 62 | 1.54 | ND (1) | | | | 11 |
| | **ATSDR Range:** | | | 0.145 | | | | 147 |
| **Aluminum** | | | | | | | | |
| | **DEP 1995** | 30 | 5536 | 387 | 7800 | 13000 | 16000 | 24000 |
| **Antimony** | | | | | | | | |
| | **DEP 1995** | 90 | 0.2 | ND (0.002) | 0.34 | 1.4 | 4.8 | 22 |
| | **CA/T Project** | 746 | NC | 0.25 | 1 | 7 | 12 | 160 |
| **Arsenic** | | | | | | | | |
| | **DEP 1995** | 139 | 4.7 | ND (0.1) | 4.8 | 16.7 | 24.5 | 99 |
| | **CA/T Project** | 754 | 5.3 | 0.25 | 5.4 | 14 | 21 | 99 |
| | **H&A 2001** | 589 | 5.5 | ND | 5.57 | 11 | 12.9 | 23 |
| **Barium** | | | | | | | | |
| | **DEP 1995** | 64 | 15 | 0.42 | 15.7 | 45.2 | 52.8 | 104 |
| | **H&A 2001** | 490 | 35 | ND | 35.7 | 80.9 | 89.3 | 680 |
| **Beryllium** | | | | | | | | |
| | **DEP 1995** | 103 | 0.21 | 0.03 | 0.23 | 0.39 | 0.53 | 1.6 |
| | **CA/T Project** | 746 | 0.5 | 0.03 | 0.5 | 0.88 | 2 | 7.5 |
| | **H&A 2001** | 22 | 0.5 | ND | 0.63 | 1.15 | 1.2 | 1.3 |
| **Cadmium** | | | | | | | | |
| | **DEP 1995** | 127 | 0.43 | ND (0.01) | 0.29 | 2.06 | 3.4 | 5.9 |
| | **CA/T Project** | 756 | 0.5 | 0.1 | 0.5 | 3 | 5 | 25 |
| | **H&A 2001** | 572 | 1.8 | ND | 1.26 | 1.63 | 1.63 | 3 |
| **Chromium** | | | | | | | | |
| | **DEP 1995** | 147 | 10.3 | 0.02 | 10.6 | 28.6 | 38.8 | 105 |
| | **CA/T Project** | 756 | 13 | 1 | 15 | 39 | 50 | 530 |
| | **H&A 2001** | 589 | 22 | ND | 22 | 43.9 | 49.6 | 94 |
| **Cobalt** | | | | | | | | |
| | **DEP 1995** | 10 | 0.8 | ND (0.5) | NC | 4.4 | 4.5 | 4.7 |
| **Copper** | | | | | | | | |
| | **DEP 1995** | 103 | 7.7 | ND (0.5) | 7.3 | 37.7 | 56.1 | 160 |
| | **CA/T Project** | 742 | 34 | 1 | 30 | 170 | 320 | 5300 |
| | **H&A 2001** | 22 | 26 | 6 | 27 | 47.5 | 64.5 | 130 |

# Levels of PAHs and Metals in Soil from Various Datasets

## Appendix A - Detailed Data Summary

| | Number of Samples | Geometric Mean or Median mg/kg | <---------- PERCENTILES ----------> Minimum mg/kg | 50th mg/kg | 90th mg/kg | 95th mg/kg | Maximum mg/kg |
|---|---|---|---|---|---|---|---|
| **Iron** | | | | | | | |
| **DEP 1995** | 30 | 6031 | 444 | 7200 | 17000 | 22500 | 50000 |
| **Lead** | | | | | | | |
| **DEP 1995** | 141 | 19.5 | 1 | 19.1 | 98.7 | 158 | 326 |
| **CA/T Project** | 850 | 51 | 0.05 | 53 | 570 | 1100 | 11000 |
| **LSPA Project** | 457 | 83 | ND (5) | 83 | 640 | NC | 10600 |
| **H&A 2001** | 583 | 15 | ND | 24.4 | 78.9 | 112 | 300 |
| **Magnesium** | | | | | | | |
| **DEP 1995** | 30 | 1028 | ND (250) | 1300 | 4900 | 6700 | 11000 |
| **Manganese** | | | | | | | |
| **DEP 1995** | 30 | 81.5 | ND (3) | 110 | 300 | 365 | 460 |
| **Mercury** | | | | | | | |
| **DEP 1995** | 107 | 0.043 | ND (0.0002) | 0.066 | 0.28 | 0.43 | 1.4 |
| **CA/T Project** | 785 | 0.15 | 0.001 | 0.15 | 1.4 | 2.6 | 23 |
| **H&A 2001** | 583 | 0.2 | ND | 0.19 | 0.74 | 1.1 | 2.5 |
| **Nickel** | | | | | | | |
| **DEP 1995** | 103 | 4.6 | ND (0.5) | 5.1 | 16.6 | 22.7 | 48 |
| **CA/T Project** | 740 | 14 | 1 | 14 | 31 | 41 | 220 |
| **H&A 2001** | 22 | 34.5 | 5 | 35 | 67.5 | 70 | 101 |
| **Selenium** | | | | | | | |
| **DEP 1995** | 93 | 0.1 | ND (0.0005) | 0.17 | 0.5 | 1 | 4.6 |
| **CA/T Project** | 756 | 0.5 | 0.1 | 0.5 | 1 | 2.1 | 57 |
| **H&A 2001** | 426 | 0.84 | ND | 0.74 | 1.36 | 1.58 | 2.8 |
| **Silver** | | | | | | | |
| **DEP 1995** | 117 | 0.09 | ND (0.003) | 0.07 | 0.58 | 0.91 | 82 |
| **CA/T Project** | 756 | 1 | 0.19 | 1 | 5 | 7.3 | 81 |
| **H&A 2001** | 335 | 0.64 | ND | NC | NC | NC | 0.64 |
| **Thallium** | | | | | | | |
| **DEP 1995** | 71 | 0.1 | ND (0.005) | NC | 0.6 | 1.65 | 5 |
| **CA/T Project** | 734 | NC | 0.035 | 1 | 5 | 5 | 50 |
| **Vanadium** | | | | | | | |
| **DEP 1995** | 30 | 7.6 | ND (1) | 10.3 | 28.5 | 38.5 | 46.6 |
| **Zinc** | | | | | | | |
| **DEP 1995** | 112 | 29.3 | 3.52 | 27.7 | 116.4 | 131.2 | 190 |
| **CA/T Project** | 746 | 84 | 5.8 | 73 | 340 | 590 | 5000 |
| **H&A 2001** | 22 | 67 | 15 | 58.5 | 103 | 106 | 120 |

**ENCLOSURE 2**

**RTCs DOCUMENT FOR FOLLOW-UP COMMENTS RECEIVED FROM RIDEM ON THE REVISED DRAFT FS FOR IRP SITE 16 AT THE FORMER NCBC DAVISVILLE, RHODE ISLAND**

# Navy Response to Follow-Up RIDEM Comments on Revision 1 of the Feasibility Study for IRP Site 16 (Dated February 2011) Former Naval Construction Battalion Center Davisville Davisville, Rhode Island (RIDEM Correspondence Dated September 13, 2011)

## RIDEM GENERAL COMMENTS

**General Comment No. 1** – The soil alternatives address residential and commercial/industrial use, but note that residential use is not permitted on the MARAD property. This is true. What the soil alternatives do not address is the existing and anticipated future recreational use of the MARAD property. There is a small portion of the marina and also contained within the Site 16 boundaries that is currently recreational in land use and will remain so well into the future. The feasibility study must address this land use and be accounted for in the soil alternatives.

***Navy Response to RIDEM General Comment No. 1:*** *As noted in Table 2-3 of the Revised Draft FS for Site 16, the current and potential future recreational land use at Site 16 has been considered in the development of preliminary remediation goals for soils at Site 16. Specifically, note the information presented in the last three column headings of the referenced table:*

- *Selected Preliminary Remediation Goal – Industrial or Recreational Scenario*
- *Selected Preliminary Remediation Goal – Residential Scenario*
- *Rationale for Selected Preliminary Remediation Goal*

*Please note that, for example, the rationale presented for the selection of PRGs for the carcinogenic PAHs (presented in terms of benzo(a)pyrene equivalents [BaPeqs]):*

> *"The lower of the calculated PRGs for the industrial or recreational land use scenarios for the 1E-05 cancer risk level is the primary recommended soil PRG for the carcinogenic PAHs at Site 16. Note that all calculated PRGs/published RIDEM direct contact criteria for the residential land use scenario are less than typical anthropogenic background levels."*

*Please also see response to RIDEM Specific Comment No. 4 and RIDEM Specific Comment No. 7.*

**Follow-up RIDEM Comment on Navy Response** – The next to last column in Table 2-3 implies that the direct exposure criteria for recreational use are the same as industrial/commercial direct exposure criteria for recreational use are the same as industrial/commercial direct exposure criteria. Section 3.5.8 of the RIDEM Remediation Regulations clearly notes that unrestricted outdoor recreational areas are subject to the residential direct exposure criteria. Section 3.3.4 of the RIDEM Remediation Regulations does not apply to the marina (explanation provided in Comment 4). Please revise Table 2-3 to show recreational use along with residential PRGs.

***Follow-up Navy Response to General Comment No. 1:*** *Please see Navy response to RIDEM Comment No 4.*

**General Comment No. 2** – To save the Navy resources for the soil alternatives, where direct contact only is an issue, RIDEM could accept 6" of clean soil with a minimum of 4" of asphalt or

concrete or 1" of clean soil underlain with a geo-fabric material and an appropriate ELUR to maintain said covers.

***Navy Response to RIDEM** General/ **Comment No. 2:** Comment acknowledged. This will be noted in the text and considered in the design phase.*

**Follow-up RIDEM Comment on Navy Response –** Response is acceptable. The Navy will note this in the text and be considered in the design phase.

***Follow-up Navy Response to RIDEM General Comment No. 2:** Comment acknowledged. RIDEM accepted Navy's response.*

## RIDEM SPECIFIC COMMENTS

**RIDEM Specific Comment No. 1:** Page 1-12, Section 1.2.3.2, Site 16 Geology, Paragraph 2, Sentence 3: *"Also in the North Central Area of the site and toward Allen Harbor, relatively recent material was deposited on top of the undisturbed deposits but below the reworked soil and fill material (including the observed waste materials))."* Please clarify this sentence as it is not clear how recently deposited materials are below reworked soil and fill materials.

***Navy Response to Comment No. 1:** The "reworked soil and fill materials" are above the "relatively recent materials" which are above the "undisturbed deposits". The "recent materials" are "relatively recent materials" in a geological/depositional sense only. In contrast, "reworked soil and fill materials" were probably added to the North Central Area within the past 100 years as the area was altered during human activities such the filling in of wetland areas or as the result of Navy use of the area. This wording will be clarified in Section 1.2.3.2.*

**Follow-up RIDEM Comment on Navy Response –** Response is acceptable. The Navy will clarify wording in Section 1.2.3.2.

***Follow-up Navy Response to RIDEM Specific Comment No. 1 –** Comment acknowledged. RIDEM accepted Navy's response.*

**RIDEM Specific Comment No. 2:** Page 1-20, Section 1.2.4, Nature and Extent of Contamination, Metals: this section notes the EPA Industrial/Commercial screening criteria for lead as 800 mg/kg. Please be advised that the RIDEM Industrial/Commercial direct exposure criteria for lead is 500 mg/kg. Please revise this section accordingly.

***Navy Response to Comment No. 2:** A sentence will be added to the referenced text acknowledging the RIDEM Method 1 Industrial/Commercial direct exposure criteria of 500 mg/kg (also see Table 2-3 of the Feasibility Study). However, as allowed by Method 3 of the RIDEM Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases (i.e., the RIDEM Remediation Regulations), the Navy has conducted a site-specific, baseline risk assessment using current risk assessment methodology.*

*Consequently, the remedial goals presented in Table 2-3 of the FS document are also derived using the methodology specified in the site-specific baseline risk assessment. This methodology was specified in the Phase III remedial investigation report for NCBC Davisville Site 16 (March 2009). Specifically, current EPA models (i.e., the IEUBK Model and TRW model) were used to conduct the site-specific baseline risk assessment and, subsequently, calculate remedial goals for lead in soils.*

**Follow-up RIDEM Comment on Navy Response** – The Navy states that they will add a sentence acknowledging the RIDEM Industrial/Commercial Direct Exposure criteria of 500 mg/kg; however, the Navy conducted a Method 3 risk assessment and reference the USEPA IEUBK and TRW models for assessment of lead in soils. Please be advised that RIDEM does not accept the USEPA IEUBK model for lead due to the methodology used to derive the PRGs. Therefore, RIDEM will defer to the Method 1 Direct Exposure Criteria.

***Follow-up Navy Response to RIDEM Specific Comment No. 2:*** *The comment/issue will be addressed once the on-going "dispute resolution" for the Navy's Newport facility is resolved.*

**RIDEM Specific Comment No. 3:** Page 1-23, Section 1.2.6.1.1, Soil Exposure Units, Bullet 3: This bullet states that a forensics analysis indicates that PAHs found in this area (south of Building 41) are from coal tar pitch and building materials rather than from fuel, therefore no remedial action is proposed. Since this is a public document, please explain the circumstances under which the decision was made not to remediate this contamination (additional sampling) since clean-up standards are based on level of contamination, irrespective of source.

***Navy Response to Comment No. 3:*** *The Navy's rationale for not recommending remediation of the polycyclic aromatic hydrocarbons (PAH) at location SB16-A3-12 is that, in contrast to the PAH contamination associated with the creosote dip tank area and the fire training area, the PAHs in soils to the south of Davisville Road appear to be most likely associated with the asphalt (which is everywhere in this portion of Site 16) and/or remnants of previously demolished buildings. Specifically, the PAHs do not appear to be related to releases from specific units or processes associated with past Navy operations. The PAHs detected south of Davisville Road are likely similar to those found in most developed areas across the United States and thus, because of their likely source, do not constitute a CERCLA release. The text will be updated with this information.*

*Also, it should be noted that it is very common to find polycyclic aromatic hydrocarbons (PAHs) in soils as a consequence of human activities that are not specifically associated with actual chemical spills/releases at a site undergoing an environmental investigation. PAHs are components of many fuels and products used in our industrialized society, (e.g., crude oil, coal tar, creosote, asphalt, building materials). They are formed during the incomplete burning of organic material (e.g., coal, oil, gasoline, and garbage). They are associated with human activities such as cooking, heating homes and industries, operation of gasoline/diesel fueled vehicles, and the emptying of fireplaces and stoves, etc.*

*Therefore, the Navy believes that it is important to consider the probable source of PAHs in soils when making remedial decisions. Consequently, soil samples were collected in the developed portion of Site 16 (an area currently paved with asphalt) during the summer of 2010 and evaluated (using environmental forensics techniques) to determine the probable source of the PAHs detected in soil samples originally collected in 2007. As noted above and in Appendix G of Revision 0 of the Data Package for the 2010 Feasibility Study Support Field Investigation (November 2010), the environmental forensics evaluation concluded that the PAHs detected were consistent coal tar pitch and building materials (not site operations such as the creosote dip tank in the NCA or fuel spills) or associated with the asphalt in the developed portion of Site 16.*

*Therefore, the remediation of the PAH in the soils of the developed portion of Site 16 is not evaluated in the Revised FS for Site 16.*

**Follow-up RIDEM Comment on Navy Response** – Response is acceptable.

***Follow-up Navy Response to RIDEM Specific Comment No. 3:*** *Comment acknowledged. RIDEM accepted Navy's response.*

**RIDEM Specific Comment No. 4:** Page 1-25, Section 1.2.6.1.2, Risk Summary, Paragraph 1: This paragraph notes that Site 6 is not currently used for residential purposes and the anticipated future use of the land is commercial/industrial. A portion of the site is currently a marina and is expected to remain so well into the future. Section 3.58 of the RIDEM Remediation Regulations notes that recreational areas are subject to residential direct exposure criteria. Please revise this paragraph to note that recreational criteria (residential direct exposure criteria) apply to the portion of the site that is leased by the Yacht Club that lies within the boundaries of IR Site 16.

***Navy Response to Comment No. 4:*** *Agree that a portion of Site 16 is currently used as a marina. However, as indicated in the following discussion, both Section 3.5.8 and Section 3.3.4 of the RIDEM regulations provide guidance regarding the recreational land use scenario.*

***Section 3.5.8*** *of the RIDEM regulations states that:*

> *Residential Activity shall mean any activity related to a (1) residence or dwelling, including but not limited to a house, apartment, or condominium, or (2) school, hospital, day care center, playground, or* ***unrestricted outdoor recreational area*** *(emphasis added).*

***Section 3.3.4*** *of the RIDEM regulations states that:*

> *Industrial/Commercial Activity shall mean any activity related to the commercial production, distribution, manufacture, or sale of goods or services, or any other activity which in not a traditional residential activity as defined by this Section* ***including activities related to outdoor recreational areas with restrictions in place to limit potential exposure*** *(emphasis added).*

*The following restrictions already apply per the lease (wording from page 3-14 of the FS):*

> *Parcel 7 has been approved for a port facility PBC through MARAD. The purpose of the conveyance must be for the development or operation of a port facility in perpetuity. MARAD has determined that the use of port property for residential use will not likely qualify as an acceptable use of PBC property; accordingly, any request for residential land use would require MARAD review and approval. Also, the lease requires than any additions to, or alterations of the leased premises requires approval of the Government (Navy).*

*The environmental land use restriction (ELUR) developed for Parcel No. 7 will prohibit the activities specifically identified under Section 3.5.8 of the RIDEM regulations (housing, apartments, condominiums, schools, day care centers, playgrounds). Any structure or facility that might specifically allow/promote other recreational activities (e.g., playgrounds or formal beach areas and the associated structures, etc.), particularly those that would allow more intensive exposure to site soils than possible under the current land use and activities, would be prohibited.*

**Follow-up RIDEM Comment on Navy Response –** Section 3.3.4 of the RIDEM Remediation Regulations does not apply to the marina. The intent of Section 3.3.4 was to allow recreational uses on industrial land that would essentially be restricted to the firm's employees and not open to the general public. These areas would still require some form of protective cover with appropriate ELUR, but would otherwise meet industrial/commercial direct explosure criteria.

The Navy Yacht Club, by its very nature, is a recreational activity. Moreover, the Navy Yacht Club is open to the general public (it is recognized that customers must meet certain minimum requirements to dock their boats there) and for all intents and purposes is unrestricted. Therefore Section 3.5.8 of the RIDEM Remediation Regulations applies.

Of the entire Yacht Club parcel, approximately one acre (42,000 $ft^2$) lays within the Site 16 boundaries. Of that one acre RIDEM only has concerns with approximately 1000 $ft^2$ of soil to the southeast of Building E-107 (EBS Item 60). In their response to this comment the Navy has proposed numerous restrictions to be applied to the property (any structure that would promote other recreational activities, playgrounds or anything that would promote more intense exposure to soils). Given the limited nature of the soil contamination, RIDEM does not see the need to encumber the entire property with these proposed restrictions. RIDEM would suggest that the contaminated soil be removed or if the Navy insists on the restrictions that they apply only to that small portion of contaminated soil along with a soil cover and soil management plan.

***Follow-up Navy Response to RIDEM Specific Comment No. 4:*** *While the Navy appreciates the explanation of the "intent" of Section 3.3.4 of the RIDEM Regulations, the actual text of the regulations does not specify that the section was "to allow recreational uses on industrial land that would essentially be restricted to the firm's employees and not open to the general public." However, per the RIDEM recommendation, the Navy FS (and Proposed Plan) for Site 16 will consider "that the contaminated soil be removed or if the Navy insists on the restrictions that they apply only to the small portion of contaminated soil along with a soil cover and soil management plan."*

**RIDEM Specific Comment No. 5:** Page 2-1, Section 2.1, Media of Concern, Paragraph 2: It is stated in this paragraph that Rhode Island does not have an EPA-endorsed Comprehensive State Groundwater Protection Program so Rhode Island's GB groundwater classification was not used in the development of PRGs and remedial alternatives. Please be advised that standards for groundwater classified as GB are based on promulgated regulations and are therefore valid standards whether EPA endorses them or not. Please revise this paragraph in addition to revising the PRGs to include the RIDEM GB groundwater classification.

***Navy Response to Comment No. 5:*** *The referenced text is a statement of fact and will not be changed. However, the Navy agrees that the groundwater underlying Site 16 is classified by the State of Rhode Island as GB and did include both RIDEM GA and GB criteria on Table 2-4 of the FS (Preliminary Remediation Goals – Groundwater). Thus, the RIDEM criteria were considered during the evaluation of potential groundwater PRGs for Site 16. However, as noted on page 2-1 of the FS, the groundwater underlying Site 16 is classified by EPA as EPA Class II groundwater. Thus, EPA SDWA MCLs (or risk-based numbers derived assuming domestic use of a water supply) were recommended as groundwater PRGs. These numbers are lower than (more conservative than) the GB criteria presented in Table 2-4.*

**Follow-up RIDEM Comment on Navy Response –** Response is acceptable, however, please note in the text, in this paragraph, that EPA's Class II groundwater classification has more stringent standards than RIDEM's GB groundwater classification and this is why they are being used.

***Follow-up Navy Response to RIDEM Specific Comment No. 5:*** *Comment acknowledged. RIDEM accepted Navy's response.*

**RIDEM Specific Comment No. 6:** Page 2-5, Section 2.2.2, Chemicals of Concern in Groundwater, Bullet 2, Last Sentence: Based on this sentence it appears that only dissolved

COCs that exceed either MCLs or RSLs are included for further consideration in the FS. Please be advised that Table 1, associated with Rule 11.3 of the RIDEM Groundwater Quality Regulations require that analysis be based on *unfiltered samples.* Please include aluminum, lead, silver and thallium in the analysis.

***Navy Response to Comment No. 6:*** *The Navy agrees that, ideally, remedial decisions should be based on unfiltered metals concentrations in groundwater. However, as discussed in the Phase III RI for Site 16 (March 2009), in Revision 1 of the FS for Site 16 at NCBC Davisville (February 2011) (see Appendix D), and in the Response-to-Comments (RTCs) for Revision 0 of the FS for Site 16 (February 2009), metals concentrations in some of the unfiltered groundwater samples collected at Site 16 appear to be a function of sample turbidity and/or salinity.*

*Additionally, the spatial distribution of metal concentrations in groundwater does not indicate that the metals concentrations in groundwater are associated with Site 16 source areas (based on review of both filtered and unfiltered data). Consequently, metals have not been identified as COCs in groundwater for Site 16. The lack of significant metals concentrations in Site 16 soil samples, particularly from locations in the developed portion of Site 16, supports this conclusion.*

**Follow-up RIDEM Comment on Navy Response** – Response is acceptable. The Navy has stated that they agree remedial decisions should be based on unfiltered samples; however, in some of the unfiltered groundwater samples metals concentrations appeared to be a function of turbidity and salinity. The Navy also states that metals concentration in groundwater are not associated with Site 16 source areas. The Navy also notes that the lack of significant metals concentrations in Site 16 soil, particularly from the developed portion of Site 16 supports this conclusion. Please note, however, that there are metals in the undeveloped portion of the site.

***Follow-up Navy Response to RIDEM Specific Comment No.6:*** *Comment acknowledged. RIDEM accepted Navy's response.*

**RIDEM Specific Comment No. 7:** Page 2-6, Section 2.3, Remedial Action Objectives, Paragraph 3: This paragraph states that the site will be used for commercial and industrial purposes only. Please revise this paragraph to note that a portion of the site is occupied by the Yacht Club, which under the RIDEM Remediation Regulations is defined as recreational use. Please note this will also affect the soil remedial action objectives in Section 2.3.1.1.

***Navy Response to Comment No. 7:*** *Please see response to RIDEM General Comment No. 1, and RIDEM Specific Comment No. 4.*

*Also, the text will be updated to acknowledge the recreational use of the land in the immediate vicinity of the marina.*

**Follow up RIDEM Comment on Navy Response** – See RIDEM comment on Navy response to General Comment 1 and Specific Comment 4.

***Follow-up Navy Response to RIDEM Specific Comment No. 7:*** *Please see response to RIDEM Specific Comment No. 4.*

**RIDEM Specific Comment No. 8:** Action Specific ARARs: A Table needs to be included for action specific ARARs. The following items need to be placed in this table:

| Process | Requirement | Status | Synopsis | Action to be Taken to Meet ARAR |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Groundwater Monitoring | Rules and regulations for Groundwater Quality (12-100-006) | Applicable | Rules and regulations intended to protect and restore the quality of the State's groundwater. Includes groundwater monitoring requirements and monitoring well construction abandonment. Also establishes groundwater quality standards and/or requirements. | Groundwater monitoring program will comply with these regulations. |
| | Rhode Island Hazardous Waste Management Act of 1978 (RIGL 23-19.1 et seq) | Relevant and Appropriate | Rules and regulations for hazardous waste generation, transportation, treatment, storage, and disposal. They incorporate, by reference, the Federal RCRA requirements. | Wastes generated during monitoring and excavation activities will be managed in accordance with these regulations. |
| | Water Pollution Control (RIGL 46-12 et seq) and Water Quality Standards and Ambient Water Quality Guidelines | Relevant and Appropriate | Establishes water use classification and water quality criteria for all waters of the State. Establishes acute and chronic ambient water quality criteria for the protection of aquatic life. | Discharges of groundwater from the site to surface water will comply with the substantive portions of these regulations to the extent they are more stringent than federal standards. |
| | State of Rhode Island Rules and Regulations for the Investigation and Remediation of hazardous material Releases; DEM-DSR-01-93 - Sections 9, 10, 11 and 12 | Relevant and Appropriate | Establishes minimum requirements for a remedial action work plan, approvals, the remedial action and requirements for managing arsenic in soil. | These sections are required in order to insure proper steps are accomplished to successfully implement the ultimate remedial response and arsenic is a COC. |

***Navy Response to Comment No. 8:*** *The Navy agrees/disagrees as follows:*

- *Groundwater Monitoring: The Navy agrees to add the first part as Rule 12 (substantive requirements only). However, the second part is Appendix I which is already included on the table.*
- *Hazardous Waste Management: Hazardous Waste Identification and Generator Requirements are already on table. Transportation and Disposal are excluded because they are off-site activities.*
- *Water Pollution Control: Regulations for RIPDES and RI Water Quality Criteria are already on table.*
- *Remediation Regulations Rules 9 (Work Plan), 10 (Approvals), 11 (Remedial Action), and 12 (Special Requirements for Managing Arsenic in Soil): Disagree with including Rules 9,*

*10, and 11 because they are primarily administrative or include subjects that are covered by the CERCLA process. Disagree with Rule 12 because it covers sampling activities that would have been performed in the Remedial Investigation stage. In addition, Rule 12 is based on the RIDEM Method 1 for arsenic and the proposed PRG for arsenic is greater than the RIDEM Method 1 value.*

**Follow-up RIDEM Comment on Navy Response** – Bullet 1; Groundwater Monitoring – Response is acceptable. Bullet 2; Hazardous Waste Management Regulations – Disagree with Navy response, if one of the alternatives involves excavation and off-site disposal then the transportation and disposal portion of the Regulation is relevant and appropriate. Bullet 3; Water Pollution Control Regulations – Response is acceptable. Bullet 4; Remediation Regulations – The USEPA Region 9 regional screening Level (June 2011) is 0.39 mg/kg (residential) and 1.6 mg/kg (industrial) which are risk based numbers. RIDEM Remediation Regulations are based on the 95% UCL. It is unlikely that RIDEM would approve of a PRG greater than what the Remediation Regulations allow. Therefore, please include Section 12 of the RIDEM Remediation Regulations as an ARAR.

***Follow-up Navy Response to RIDEM Specific Comment No. 8:*** *Bullet 1 – Comment acknowledged. RIDEM accepted Navy's response. Bullet 2 – Disagree. Hazardous Waste Transport and off-site disposal are off-site activities and are required in any case. Therefore, they are excluded from the ARAR analysis. Bullet 3 – Comment acknowledged. RIDEM accepted Navy's response. Bullet 4 – Please see Appendix D.2 of the FS. The analysis presented suggests that the NCBC background soil dataset is very similar to the RIDEM background soil dataset (i.e., the datasets compliment/validate each other). Therefore, there is no reason to discount the NCBC background soil dataset as "invalid" for purposes of defining a background soil concentration for arsenic in soils. The 95% upper prediction value presented in Appendix D.2 should be accepted and used as the arsenic soil PRG for Site 16. Given the fact that much of the NCA was "filled" over time, this value is actually a very conservative concentration because metals concentrations in "fill soil" tend to be higher than in "non-fill soils."*

**RIDEM Specific Comment No. 9:** Table 2-2, Location Specific ARARs: The following needs to be added to this table:

| Process | Requirement | Status | Synopsis | Action to be Taken to Meet ARAR |
|---|---|---|---|---|
| | Rhode Island Historic Preservation Act (RIGL 42-45 et seq) | Applicable | This act requires the recovering and preservation of archeological and historic data and artifacts when threatened by a publicly funded action. | Compliance with this requirement in the event historical or archeological artifacts are discovered during remedial activities. |

***Navy Response to Comment No. 9:*** *Disagree. Existing site information (Archaeological Sensitivity Assessment and Archeological Survey for Base Closure and Realignment, Redevelopment, and Reuse at the Naval Construction Battalion center Davisville, Rhode Island, October 1994) and previous site activities do not suggest the presence of historic features at Site 16.*

**Follow-up RIDEM Comment on Navy Response** - Response is acceptable provided that documentation showing coordination with the Rhode Island Historical Preservation Society has taken place.

***Follow-up Navy Response to RIDEM Specific Comment No. 9:*** *Comment acknowledged. RIDEM partially accepted Navy's response.*

**RIDEM Specific Comment No. 10:** Table 2-3; Preliminary Remediation Goals – Soil – Under the column for RIDEM Direct Contact Risk – Under this column PRGs are provided for Residential, Commercial and Recreational scenarios. For the recreational scenario it is consistently labeled as NA (Not Applicable). Please revise this to be the same value as the residential PRG since Section 3.58 of the RIDEM Remediation Regulations defines recreational use as having the same maximum exposure criteria as residential use.

***Navy Response to Comment No. 10:*** *Please see response to RIDEM General Comment No. 1, and RIDEM Specific Comment No. 4.*

**Follow-up RIDEM Comment on Navy Response –** See RIDEM comment on Navy response to General Comment 1 and Specific Comment 4.

***Follow-up Navy Response to RIDEM Specific Comment No. 10:*** *Please see response to RIDEM Specific Comment No. 4.*

**RIDEM Specific Comment No. 11:** Page 2-14, Section 2.5.2, Action Specific ARARs, Paragraph 1, Sentence 1: "Action-specific ARARs and TBCs are technology or activity based regulatory requirements or guidance that would control or restrict remedial action." Please change this to: "Action-specific ARARs and TBCs are technology or activity based regulatory requirements or guidance that would provide upper or lower boundaries on the implementation of remedial actions." The ARARs and TBCs do not restrict one's choice of a reasonable remedial action; they just place boundaries on what is acceptable.

***Navy Response to Comment No. 11:*** *Disagree. This current text is a variation of text that appears in guidance documents for ARARs.*

**Follow-up RIDEM Comment on Navy Response** – The Navy responded that the original statement is a variation of the text that appears in guidance documents for ARARs. If the Navy does not like RIDEM's revision to this statement then replace it with the actual statement in the guidance document.

***Follow-up Navy Response to RIDEM Specific Comment No. 11:*** *The text will be amended to match the actual statement in the guidance document.*

**RIDEM Specific Comment No. 12:** Page 3-5, Section 3.2.2.1, LUCs, Effectiveness – Arsenic, lead, benzene, TPH, PAHs and other organics remain at the site. It is pointed out that prohibiting residential use would prevent the occurrence of unacceptable risk to human receptors from direct exposure to contaminated soil. Please revise this paragraph to state that at various locations all the above mentioned COCs also exceed commercial/industrial direct exposure criteria. It would follow then that commercial/industrial use would also need to be prohibited. Clearly this is not reasonable. Perhaps the entire paragraph should be revised to state that LUCs, by themselves are not effective in protecting human health and the environment, but instead could be used to supplement a more aggressive remedial action.

***Navy Response to Comment No. 12:*** *Agree. The subject text will be revised to state that LUCs can also be used restrict other activities. However, please note that this is a general text, and*

*specific LUCs are discussed with the alternatives. The "Conclusion" section already notes that LUCs would be used in combination with other process options.*

**Follow-up RIDEM Comment on Navy Response** – Response is acceptable. Navy agreed to revise text.

***Follow-up Navy Response to RIDEM Specific Comment No. 12:*** *Comment acknowledged. RIDEM accepted Navy's response. (Test will be revised.)*

**RIDEM Specific Comment No. 13:** Page 3-6, Section 3.2.3, Containment, Effectiveness, Last Sentence: This sentence points out that capping and covering is typically incompatible with residential development that would make maintenance very difficult. Please revise the sentence to point out that under the industrial/commercial scenario the same could also be said where development of the land is likely. There is no guarantee on how long NORAD will remain at the site and many portions of Parcels 7 and 8 have yet to be developed.

***Navy Response to Comment No. 13:*** *The text will be revised to note that caps/covers can sometimes be difficult to maintain in industrial/commercial scenarios, although such cases are typically under single ownership and easier to control. It is assumed that LUCs will be applied to all parcels.*

**Follow-up RIDEM Comment on Navy Response:** Response is acceptable. Navy agreed to revise statement.

***Follow-up Navy Response to RIDEM Specific Comment No. 13:*** *Comment acknowledged. RIDEM accepted Navy's response. (Text will be revised.)*

**RIDEM Specific Comment No. 14:** Page 3-7, Section 3.2.4, Removal, Paragraph 1: Please explain and provide a reference as to why the load bearing capacity of the soil must be greater than 1,500 lbs/ft$^2$ in order to consider a removal action. In addition, please provide the test results that Navy has taken of the load bearing capacity of the soil at Site 16 along with a map delineating areas of less than 1,500 lbs/ft$^2$ since apparently this will have an impact on where removal actions can be implemented. As a reminder to the Navy, at Tank Farm 4 at Naval Education and Training Center in Newport an oil/water separator and oil contaminated soil was removed from wetlands. In addition, as part of an NRDA claim from the U.S. Fish and Wildlife Service muck was dug out of the wetlands that lie between Calf Pasture Point and Allen Harbor Landfill to improve flora quality. It is highly unlikely that the local bearing capacity of these soils was in excess of 1,500 lbs/ft$^2$. Perhaps the Navy should consider the use of a lighter piece of equipment for soil removal.

***Navy Response to Comment No. 14:*** *The section provides a general discussion of technologies and the example 1,500 lb/sf value is not meant to be absolute. The subject text will be deleted.*

**Follow-up RIDEM Comment on Navy Response** – Response is acceptable. Navy will remove this text from document.

***Follow-up Navy Response to RIDEM Specific Comment No. 14:*** *Comment acknowledged. RIDEM accepted Navy's response. (Text will be revised.)*

**RIDEM Specific Comment No. 15:** Table 3-2; Preliminary Screening of Remedial Technologies and Process Options for Groundwater, LUCs, Passive Controls, Screening Comment: This section notes that groundwater use is restricted through the MARAD and LIFOC. The LIFOC ends once the land is transferred and MARAD use is not guaranteed (QDC could decide to just purchase the land). Please revise to state that depending on alternative selected an **environmental** groundwater restriction would need to be placed on the land in accordance with RIDEM Remediation Regulations.

***Navy Response to Comment No. 15:*** *The text will be revised to note that the existing LUCs will be used until final LUCs for the site are prepared as part of the ROD and LUC Remedial Design.*

**Follow-up RIDEM Comment on Navy Response –** Response is acceptable provided that it is pointed out the environmental LUCs will be prepared as part of the ROD and LUC remedial design.

***Follow-up Navy Response to RIDEM Specific Comment No. 15:*** *Comment acknowledged. RIDEM generally accepted Navy's response, but with provision that LUCs be described as environmental LUCs.*

**RIDEM Specific Comment No. 16:** Page 3-14, Section 3.5.2.1, LUCs, Bullet 1, Parcel 7 – This paragraph states that MARAD has determined that residential use of the property would likely not qualify as an acceptable use of the property. While this is true, MARAD does approve of the use of the property for marinas (information obtained from RIDEC). As the Navy is well aware, under the RIDEM Remediation Regulations, a marina is considered recreational use. The clean-up standards for recreational use are the same as the residential clean-up standards. Please note this in this paragraph.

***Navy Response to Comment No. 16:*** *Please see response to RIDEM General Comment No. 1, RIDEM Specific Comment No. 4, and RIDEM Specific Comment No. 7.*

**Follow-up RIDEM Comment on Navy Response –** See RIDEM comment on Navy response to General Comment 1 and Specific Comment 4.

***Follow-up Navy Response to RIDEM Specific Comment No. 16:*** *Please see response to RIDEM Specific Comment No. 4.*

**RIDEM Specific Comment No. 17:** Page 3-18, Section 3.5.3.1, Extraction Wells, Implementability, Paragraph 2 – The last sentence states that BRAC PMO approval is required prior to the implementation of this alternative. This statement should be removed as it makes it sound as though the Navy is proposing an alternative they cannot implement.

***Navy Response to Comment No. 17:*** *Agree. The referenced text regarding the BRAC PMO will be deleted.*

**Follow-up RIDEM Comment on Navy Response –** Response is acceptable. Navy will remove references to prior BRAC PMO approval.

***Follow-up Navy Response to RIDEM Specific Comment No. 17:*** *Comment acknowledged. RIDEM accepted Navy's response. (Test will be revised.)*

**RIDEM Specific Comment No. 18:** Page 3-23, Section 3.5.5.1, Filtration, Implementability, Paragraph 2 – See comment 17. In addition, given the nature of groundwater contamination, it would seem that filtration would not be a standalone alternative, but rather would be used in conjunction with another alternative. Please explain why the Navy feels this technology would require special approval from the BRAC PMO.

***Navy Response to Comment No. 18:*** *Please see response to RIDEM Specific Comment No. 17. The referenced text regarding the BRAC PMO will be deleted.*

**Follow-up RIDEM Comment on Navy Response –** Response is acceptable. Navy will remove references to prior BRAC PMO approval.

***Follow-up Navy Response to RIDEM Specific Comment No. 18:*** *Comment acknowledged. RIDEM accepted Navy's response. (Text will be revised.)*

**RIDEM Specific Comment No. 19:** Page 3-25, Section 3.5.5.2, Air Stripping, Implementability, Paragraph 1 – See comment 17.

***Navy Response to Comment No. 19:*** *Please see response to RIDEM Specific Comment No. 17.*

**Follow-up RIDEM Comment on Navy Response –** Response is acceptable. Navy will remove references to prior BRAC PMO approval.

***Follow-up Navy Response to RIDEM Specific Comment No. 19:*** Comment acknowledged. RIDEM accepted Navy's response. (Text will be revised.)

**RIDEM Specific Comment No. 20:** Page 3-25, Section 3.5.5.3, Liquid-Phase GAC Adsorption, Paragraph 3 – Please change NPDES to RIPDES as Rhode Island has an EPA approved program.

***Navy Response to Comment No. 20:*** *Agree.*

**Follow-up RIDEM Comment on Navy Response –** Response is acceptable. Navy will change NPDES to RIPDES.

***Follow-up Navy Response to RIDEM Specific Comment No. 20:*** *Comment acknowledged. RIDEM accepted Navy's response. (Text will be revised.)*

**RIDEM Specific Comment No. 21:** Page 3-26, Section 3.5.5.3, Liquid-Phase GAC Adsorption, Implementability, Paragraph 2 – See comment 17.

***Navy Response to Comment No. 21:*** *Please see response to RIDEM Specific Comment No. 17.*

**Follow-up RIDEM Comment on Navy Response –** Response is acceptable. Navy will remove references to prior BRAC PMO approval.

***Follow-up Navy Response to RIDEM Specific Comment No. 21:*** *Comment acknowledged. RIDEM accepted Navy's response. (Text will be revised.)*

**RIDEM Specific Comment No. 22:** Page 3-28, Section 3.5.5.5, Neutralization/pH Adjustment, Implementability, Paragraph 2 – See comment 17.

***Navy Response to Comment No. 22:*** *Please see response to RIDEM Specific Comment No. 17.*

**Follow-up RIDEM Comment on Navy Response –** Response is acceptable. Navy will remove references to prior BRAC PMO approval.

***Follow-up Navy Response to RIDEM Specific Comment No. 22:*** *Comment acknowledged. RIDEM accepted Navy's response. (Text will be revised.)*

**RIDEM Specific Comment No. 23:** Page 3-30, Section 3.5.6.1, Direct Surface Discharge, Effectiveness & Implementability – Please change NPDES to RIPDES as Rhode Island has an EPA approved program.

***Navy Response to Comment No. 23:*** *Agree.*

***Follow-up RIDEM Comment on Navy Response*** – Response is acceptable. Navy will change NPDES to RIPDES.

***Follow-up Navy Response to RIDEM Specific Comment No. 23:*** *Comment acknowledged. RIDEM accepted Navy's response. (Text will be revised.)*

**RIDEM Specific Comment No. 24:** Page 4-3, Section 4.1.1.7, Cost – This section notes a planning horizon of 30 years, but does not include an interest rate. Please provide the interest rate used to generate present value costs for the alternatives. The interest rate used can have an impact on alternative selection.

***Navy Response to Comment No. 24:*** *Agree. The interest rate is noted on the cost estimate spreadsheets, and will be added to the text. The value is 2.3%.*

**Follow-up RIDEM Comment on Navy Response –** Response is acceptable. The Navy will add the interest rate of 2.3% to the text.

***Follow-up Navy Response to RIDEM Specific Comment No. 24:*** Comment acknowledged. RIDEM accepted Navy's response. (Test will be revised.)

**RIDEM Specific Comment No. 25:** Page 4-6, Section 4.2.1.1, Alternative S-1: No action, Description – This section notes that residential use, groundwater extraction and uses limited to port activities are included as restrictions on property use, though they are not environmental in nature. Please note that recreational use of the property exists and is permitted as noted in comment 16.

***Navy Response to Comment No. 25:*** *Please see response to RIDEM General Comment No. 1, RIDEM Specific Comment No. 4, and RIDEM Specific Comment No. 7.*

**Follow-up RIDEM Comment on Navy Response** – See RIDEM comment on Navy response to General Comment 1 and Specific Comment 4.

***Follow-up Navy Response to RIDEM Specific Comment No. 25:*** *Please see Navy response to RIDEM Specific Comment No. 4.*

**RIDEM Specific Comment No. 26:** Page 4-8, Section 4.2.2.1, Alternative S-2, Description – Six major components are stated, but only five are presented. Please correct.

***Navy Response to Comment No. 26:*** *Agree.*

**Follow-up RIDEM Comment on Navy Response** – Navy agrees with response, though it is not clear if there is a sixth component to the alternative or if the six will be changed to a five.

***Follow-up Navy Response to RIDEM Specific Comment No. 26:*** *Comment acknowledged. RIDEM accepted Navy's response. In the first paragraph, "six" will be changed to "five".*

**RIDEM Specific Comment No. 27:** Page 4-10, Section 4.2.2.1, Alternative S-2, Component 3: Excavation near Marina – The Marina, under RIDEM Remediation Regulations, is considered recreational use and therefore Residential Direct exposure (RDEC) criteria apply. The depth of excavation would be until the RDEC are met or groundwater is encountered. Whichever is first. The depth of groundwater in this area is not deep and allowances for the structural integrity of Building E-107 can be made. Please revise this section accordingly.

***Navy Response to Comment No. 27:*** *Please see response to RIDEM General Comment No. 1, RIDEM Specific Comment No. 4, and Specific Comment No. 7.*

**Follow-up RIDEM Comment on Navy Response** – See RIDEM comment on Navy response to General Comment 1 and Specific Comment 4.

***Follow-up Navy Response to RIDEM Specific Comment No. 27:*** *Please see Navy response to RIDEM Specific Comment No. 4.*

**RIDEM Specific Comment No. 28:** Page 4-10, Section 4.2.2.1, Alternative S-2, Component 4: Monitoring – The last paragraph, of this section, states that monitoring would be quarterly for the first year, semi-annual for the next 2 years and annual thereafter. RIDEM typically monitors on a quarterly basis for two years (to get seasonal variations among other things) and evaluates the data to determine subsequent monitoring frequency. Please revise accordingly.

***Navy Response to Comment No. 28:*** *Comment noted. The frequency and scope can be discussed at the appropriate time during development of a monitoring program. For the purposes of this FS the text will not be changed.*

**Follow-up RIDEM Comment on Navy Response** – RIDEM disagrees with the Navy response. Since the Navy in their response notes that the frequency and scope of the monitoring program will be discussed during the development of the monitoring program this implies that the frequency noted in the text is subject to change. Therefore, the Navy should revise the text to state that a monitoring program will be implemented at a later date at which time the frequency, duration and scope will be determined, but for now it is noted that this would be a component of the alternative under consideration.

***Follow-up Navy Response to RIDEM Specific Comment No. 28:*** *The text in the FS concerning monitoring frequency was included for estimating purposes only. As noted in the original response, no changes are proposed at this stage.*

**RIDEM Specific Comment No. 29:** Page 4-11, Section 4.2.2.1, Alternative S-2, Component 5: LUCs, Bullet 1 – This bullet states that the purpose of the conveyance of the property is for development and operation of a port facility perpetuity and that residential use of the property would not likely be an accepted use of the property. This is true. The paragraph should also note that recreational use of the property can be an accepted use. As noted in comment 16 a marina is a permitted use. In addition a bicycle path traverses the northern border of the MARAD property. Please revise this paragraph to reflect the recreational use of the property.

***Navy Response to Comment No. 29:*** *Please see response to RIDEM General Comment No. 1, RIDEM Specific Comment No. 4, and RIDEM Specific Comment No. 7.*

**Follow-up RIDEM Comment on Navy Response –** See RIDEM comment on Navy response to General Comment 1 and Specific Comment 4.

***Follow-up Navy Response to RIDEM Specific Comment No. 29:*** *Please see Navy response to RIDEM Specific Comment No. 4.*

**RIDEM Specific Comment No. 30:** Page 4-11, Section 4.2.2.1, Alternative S-2, Component 5: LUCs, Last Paragraph, Second Sentence – This sentence states that an LUC would be added to protect the caps and covers. Since the purpose of this land is for development please state if the LUC would preclude development of construction over the caps and covers.

***Navy Response to Comment No. 30:*** *Agree. The text will be revised to state clearly that the LUC is not intended to prevent development and that if the development plans affect cover/cap systems, their functions must be restored.*

**Follow-up RIDEM Comment on Navy Response:** The Navy agrees with the comment and notes that LUCs are not intended to prevent development and if development plans affect cover/cap systems, their functions must be restored. The response is acceptable, but more precisely, it should be noted in the text that a soil management plan would be developed to allow for the development of the property while still maintaining the environmental protection aspects of the cover/cap.

***Follow-up Navy Response to RIDEM Specific Comment No. 30:*** *Comment acknowledged. RIDEM accepted Navy's response. (Text will be revised.)*

**RIDEM Specific Comment No. 31:** Page 4-12, Section 4.2.2.2, Alternative S-2, Detailed Analysis, Overall Protection of Human Health and Environment – This paragraph describes protection for residential and industrial use, but does not address the existing and anticipated future recreational use. Please address the recreational use of Site 16 (marina).

***Navy Response to Comment No. 31:*** *Please see response to RIDEM General Comment No. 1, RIDEM Specific Comment No. 4, and RIDEM Specific Comment No. 7.*

**Follow-up RIDEM Comment on Navy Response** – See RIDEM comment on Navy response to General Comment 1 and Specific Comment 4.

***Follow-up Navy Response to RIDEM Specific Comment No. 31:*** *Please see Navy response to RIDEM Specific Comment No. 4.*

**RIDEM Specific Comment No. 32:** Page 4-14, Section 4.2.3.1, Alternative S-3, Description, Component 1: Excavation – The first sentence states that COC concentrations greater than industrial PRGs would be excavated to a depth of 2 feet bgs. Please revise this to account for the recreational use associated with the marina. In the marina area the soil would need to be excavated to a depth sufficient to meet RDEC or to the water table, whichever occurs first.

***Navy Response to Comment No. 32:*** *Please see response to RIDEM General Comment No. 1, RIDEM Specific Comment No. 4, and RIDEM Specific Comment No. 7.*

**Follow-up RIDEM Comment on Navy Response** – See RIDEM comment on Navy response to General Comment 1 and Specific Comment 4.

***Follow-up Navy Response to RIDEM Specific Comment No. 32:*** *Please see Navy response to RIDEM Specific Comment No. 4.*

**RIDEM Specific Comment No. 33:** Page 4-16, Section 4.2.3.2, Alternative S-3, Detailed Analysis, Overall Protection of Human Health and the Environment, Paragraph 1, Sentence 1 – This sentence states that Alternative S-3 would be protective of human health and the environment. At this time RIDEM does not agree with this statement as Alternative S-3 does not address the recreational land use of the marine within the boundaries of Site 16.

***Navy Response to Comment No. 33:*** *Please see response to RIDEM General Comment No. 1, RIDEM Specific Comment No. 4, and RIDEM Specific Comment No. 7.*

**Follow-up RIDEM Comment on Navy Response** – See RIDEM comment on Navy response to General Comment 1 and Specific Comment 4.

***Follow-up Navy Response to RIDEM Specific Comment No. 33:*** *Please see Navy response to RIDEM Specific Comment No. 4.*

**RIDEM Specific Comment No. 34:** Page 4-17, Section 4.2.3.2, Alternative S-3, Detailed Analysis, Implementability, Last Sentence – This sentence notes that there are few structures near the excavation areas, therefore the need for shoring is limited. For consistency, the concerns associated with the marina should be mentioned in this section.

***Navy Response to Comment No. 34:*** *Agree. Protection of the marina building by shoring will be specifically identified.*

**Follow-up RIDEM Comment on Navy Response** – The Navy agrees with the comment and notes that protection of the marina building by shoring will be specifically identified.

***Follow-up Navy Response to RIDEM Specific Comment No. 34:*** *Comment acknowledged. RIDEM accepted Navy's response. (Test will be revised.)*

**RIDEM Specific Comment No. 35:** Page 4-19, Section 4.2.4.1, Alternative S-4, Description, Component 1: Excavation – Based on Figure 4-4 there will be a 10' excavation adjacent to the marina building. For consistency the concerns of excavating by this building should be mentioned.

***Navy Response to Comment No. 35:*** *Agree. Protection of the marina building by shoring will be specifically identified.*

**Follow-up RIDEM Comment on Navy Response –** The Navy agrees with the comment and notes that protection of the marina building by shoring will be specifically identified.

***Follow-up Navy Response to RIDEM Specific Comment No. 35:*** *Comment acknowledged. RIDEM accepted Navy's response. (Text will be revised.)*

**RIDEM Specific Comment No. 36:** Page 4-19, Section 4.2.4.1, Alternative S-4, Description, Component 2: Excavation near Marina – "This component would be similar to Component 3 of Alternative S-3." It is assumed Component 2 is in reference to the remedy. Component 3 of Alternative S-3 which in turn references Component 5 of Alternative S-2 relate to LUCs which would cover excavations resulting from development of this land. It is not clear how LUCs are a factor in the excavation associated with the remedy for this site. Please explain.

***Navy Response to Comment No. 36:*** *The referenced text is not correct. The text will be revised to: "..Component 3 of Alternative S-2."*

**Follow-up RIDEM Comment on Navy Response: -** Navy response is acceptable. The Navy notes that the text is not correct and will be revised to "Component 3 of Alternative S-2".

***Follow-up Navy Response to RIDEM Specific Comment No. 36:*** *Comment acknowledged. RIDEM accepted Navy's response. (Text will be revised.)*

**RIDEM Specific Comment No. 37:** Page 4-20, Section 4.2.4.2, Alternative S-4, Detailed Analysis, Overall Protection of Human Health and Environment – This section states that an LUC would be placed on the site limiting its use to industrial scenarios. A portion of the site is currently and in the foreseeable future going to be used for recreational purposes. This paragraph must recognize this. Please revise accordingly.

***Navy Response to Comment No. 37:*** *Please see response to RIDEM General Comment No. 1, RIDEM Specific Comment No. 4, and RIDEM Specific Comment No. 7.*

**Follow-up RIDEM Comment on Navy Response –** See RIDEM comment on Navy response to General Comment 1 and Specific Comment 4.

***Follow-up Navy Response to RIDEM Specific Comment No. 37:*** *Please see Navy response to RIDEM Specific Comment No. 4.*

**RIDEM Specific Comment No. 38:** Page 4-27, Section 4.3.1.1, Alternative G-1, No Action, Description, Paragraph 1, Sentence 2 – This sentence notes that LUCs are in place to prevent residential uses of the property and to prevent groundwater use for the portion of the site north of Davisville Road. Please note that RIEDC also has restrictions on groundwater use for the

property south of Davisville Road. In addition, for this groundwater alternative, as well as the others, please remove references to land use (residential, commercial, industrial or otherwise) as they have no bearing on RIDEM Remediation Regulations Groundwater Objectives or EPA MCLs.

***Navy Response to Comment No. 38:*** *(First part) Agree with clarification. Per the deed, installation of wells south of Davisville Road only requires that the Navy be notified. However, RIEDC requires tenants to purchase water from RIEDC and does not permit the installation of water supply wells. The subject text will be revised to indicate the RIEDC restriction.*

*(Second Part) Disagree with clarification. Although the land use does not determine the RIDEM Groundwater Objectives, reference to land use is included for overall context. In addition, land use will affect how vapor intrusion-based PRGs are calculated.*

**Follow-up RIDEM Comment on Navy Response –** (Part 1) - The Navy notes that they need only be notified of well installation, but RIEDC does not allow water supply wells and requires tenants to purchase water through RIEDC. Navy will revise text to reflect this. RIDEM concurs with response.

(Part 2).- Navy responded by agreeing that land use does not determine groundwater classification, but is included for context as it can affect vapor intrusion PRGs. RIDEM concurs with response as vapor-intrusion based PRGs may be less than RIDEM GB or GA Groundwater Objects as well as USEPA MCLs.

***Follow-up Navy Response to RIDEM Specific Comment No. 38:*** *(Part 1) Comment acknowledged. RIDEM accepted Navy's response. (Part 2) – Comment acknowledged. RIDEM accepted Navy's response.*

**RIDEM Specific Comment No. 39:** Page 4-30, Section 4.3.2.1, Alternative G-2, MNA & LUCs, Component 1 MNA, Paragraph 4 – This paragraph states that monitoring would be conducted annually. Typically, RIDEM requires quarterly sampling for the first two years at which time the data is reviewed to determine subsequent monitoring frequency. Please revise accordingly.

***Navy Response to Comment No. 39:*** *Please refer to the response to RIDEM Specific Comment No. 28.*

**Follow-up RIDEM Comment on Navy Response –** RIDEM disagrees with the Navy response. Since the Navy in their response notes that the frequency and scope of the monitoring program will be discussed during the development of the monitoring program will be implemented at a later date at which time the frequency, duration and scope will be determined, but for now it is noted that this would be a component of the alternative under consideration.

***Follow-up Navy Response to RIDEM Specific Comment No. 39:*** *The text in the FS concerning monitoring frequency was included for estimating purposes only. As noted in the original response, no changes are proposed at this stage. Please also see Navy response to RIDEM Comment No. 28.*

**RIDEM Specific Comment No. 40:** Page 4-31, Section 4.3.2.1, Alternative G-2, MNA & LUCs, Component 2: LUCs, Bullet 1 – Please remove the reference to land use as this has no basis with regard to groundwater issues.

***Navy Response to Comment No. 40:*** *Please refer to the response to RIDEM Specific Comment No. 38.*

**Follow-up RIDEM Comment on Navy Response –** See RIDEM response to Comment 38 (Part 2).

***Follow-up Navy Response to RIDEM Specific Comment No. 40:*** *Comment acknowledged. RIDEM accepted Navy's response. (See Navy response to Comment 38, Part 2.)*

**RIDEM Specific Comment No. 41:** Page 4-31, Section 4.3.2.1, Alternative G-2, MNA & LUCs, Component 2: LUCs Bullet 2 – Please note, in this bullet, that once a Record of Decision has been completed the Navy, within 18 months, is responsible for insuring that an Environmental Land Use Restriction (ELUR) has been placed on the property, north of Davisville Road, delineating the appropriate restrictions.

***Navy Response to Comment No. 41:*** *Agree with clarification. Per previous RIDEM comments, the LUC description will be revised to note that LUCs will be consistent with ELURs.*

**Follow-up RIDEM Comment on Navy Response –** Response is acceptable. The Navy will revise the document to note that LUCs will be consistent with ELURs.

***Follow-up Navy Response to RIDEM Specific Comment No. 41:*** *Comment acknowledged. RIDEM accepted Navy's response. (Text will be revised.)*

**RIDEM Specific Comment No. 42:** Page 4-34, Section 4.3.2.2, Alternative G-2, MNA & LUCs, Implementability, Paragraph 2 – This paragraph states that LUCs would be incorporated into the LUCIP for the property under Navy control, however, the administrative aspects for property not under Navy control will require coordination with the current property owner and/or local or state officials. Please remove the and/or local or state officials. With respect to local officials the only coordination would be the recording of an ELUR at the town hall. With respect to state officials the only coordination would be to insure the ELUR addresses what it needs to. Neither the Town nor the State can place an ELUR on the property in question without the consent of the property owner.

***Navy Response to Comment No. 42:*** *Disagree. The subject text was added at the request of USEPA. Refer to the Response to USEPA Comment No. 107 in the August 24, 2009 response-to-comments document.*

**Follow-up RIDEM Comment on Navy Response –** The Navy responded that the "and/or local or state officials" was added at the request of the USEPA. The concern was that the Navy was expecting that either local and/or state officials would become responsible for producing and/or negotiating the ELUR. It is the Navy's responsibility to work with the property owner to obtain the ELUR. Based on consultation with the USEPA the phrase may remain since the Navy and the property owner do need to coordinate with local and state officials to the extent of recording and insuring the terms of the ELUR are met.

***Follow-up Navy Response to RIDEM Specific Comment No. 42:*** *Comment acknowledged. RIDEM accepted Navy's response.*

**RIDEM Specific Comment No. 43:** Page 4-34, Section 4.3.3.1, Alternative G-3, In-Situ Chemical Oxidation, MNA and LUCs, Paragraph 1 – Please change "four major components" to "three major components".

***Navy Response to Comment No. 43:*** *Agree.*

**Follow-up RIDEM Comment on Navy Response –** Response to comment is acceptable; for alternative G-3 the Navy will change four major components to three major components.

***Follow-up Navy Response to RIDEM Specific Comment No. 43:*** *Comment acknowledged. RIDEM accepted Navy's response. (Text will be revised.)*

**RIDEM Specific Comment No. 44:** Page 4-35, Section 4.3.3.1, Alternative G-3, In-Situ Chemical Oxidation, MNA and LUCs Component 2: MNA – It is proposed for Alternative G-2 that 36 wells would be needed for monitoring purposes. It is stated in this paragraph that it is assumed that only 28 wells would need to be monitored, presumably because of the treatment. Until one knows how well the sodium permanganate is being distributed within the plume 36 wells should be monitored. After a certain period of time the data can be evaluated, and if appropriate, the number of monitoring wells could be reduced (or increased) for both Alternatives G-2 and G-3. This should be incorporated into the description of the respective components of the alternatives.

***Navy Response to Comment No. 44:*** *Disagree. The number of wells is for long-term monitoring. Short-term monitoring during treatment is included in the treatment capital costs. The assumption is that treatment will be successful and that long-term monitoring will be performed. Therefore, the number of long-term monitoring wells for active treatment alternatives is less than the number of wells in the MNA-only alternative (Alternative G-2) because fewer wells are required in the former high concentration area. Optimization of long-term monitoring, such as changes in frequency, analytes, and/or number of wells is understood as a typical part of the process and has not been noted.*

**Follow-up RIDEM Comment on Navy Response –** Response is acceptable. The Navy notes that because the area in question is receiving treatment fewer wells should be needed in this area for long-term monitoring purposes. This is separate from the short-term monitoring wells used for treatment.

***Follow-up Navy Response to RIDEM Specific Comment No. 44:*** *Comment acknowledged. RIDEM accepted Navy's response.*

**RIDEM Specific Comment No. 45:** Page 4-35, Section 4.3.3.1, Alternative G-3, In-Situ Chemical Oxidation, MNA and LUCs, Component 3: LUCs, - See Comment 41 regarding ELURs.

***Navy Response to Comment No. 45:*** *Please refer to response to RIDEM Specific Comment No. 41.*

**Follow-up RIDEM Comment on Navy Response –** Response is acceptable. The Navy will revise the document to note that LUCs will be consistent with ELURs.

***Follow-up Navy Response to RIDEM Specific Comment No. 45:*** *Comment acknowledged. RIDEM accepted Navy's response. (Text will be revised.)*

**RIDEM Specific Comment No. 46:** Page 4-36, Section 4.3.3.2, Alternative G-3, Overall protection of Human health and the Environment, Paragraph 2, Last Sentence – This sentence states that vapor intrusion would be controlled by building construction methods. Since the plume is moving please state if contingencies have been made for addressing existing buildings.

***Navy Response to Comment No. 46:*** *Disagree. The extent of the LUC boundaries will be based on extent of contamination, with considerations for plume migration. The LUC boundaries developed as part of the LUC design are assumed to be sufficient to cover/account for migration, so no contingencies were included in the description.*

**Follow-up RIDEM Comment on Navy Response –** RIDEM disagrees with the Navy response. The Navy has stated the LUC boundaries are based on the extent of contamination with considerations for plume migration and therefore cover/account for migration. RIDEM believes that there should be contingencies to address vapor intrusion into existing buildings if only as a pro-active move. As we have seen from the long-term monitoring programs from Allen Harbor Landfill and Calf Pasture Point, which are about a decade old, the plumes do move and not always in the direction that we expect. As the issue of vapor intrusion evolves it is certain that the ways in which we sample, test and determine risk will be improved and refined. Assuming that we have an appropriate long-term monitoring program we should be able to know well beforehand whether existing buildings are at risk of unacceptable vapor intrusion.

***Follow-up Navy Response to RIDEM Specific Comment No. 46:*** *The details of the LUC area will be developed and finalized when the LUC RD is prepared. Contingencies and/or coverage of existing structures can be addressed at that stage. Currently, there are no existing buildings above the shallow overburden plume nor are there any buildings immediately downgradient of that plume, so there are no buildings to address at this stage. Also, please note that all of the historical and current data (both analytical and hydrogeological suggest that the significant groundwater contamination at Site 16 (outside the immediate source areas) is in the intermediate/deep overburden and bedrock zones (i.e., not in the water table aquiver). There is no technical reason to believe that this will change. However, conservatively, the text will be revised to indicate that the potential for vapor intrusion into existing buildings would be addressed as needed (e.g., during the preparation of annual monitoring reports and Five-Year Review Reports), based on the evaluation of long-term monitoring results and observations of the plume flow.*

**RIDEM Specific Comment No. 47:** Page 4-36, Section 4.3.3.2, Alternative G-3, Long-Term Effectiveness and Permanence, Paragraph 4, Last Sentence – See comment 46 regarding existing buildings and vapor intrusion.

***Navy Response to Comment No. 47:*** *Please refer to response to RIDEM Specific Comment No. 46.*

**Follow-up RIDEM Comment on Navy Response –** See RIDEM comment on Navy response to Comment 46.

***Follow-up Navy Response to RIDEM Specific Comment No. 47:*** *Please see Navy response to RIDEM Specific Comment No. 46.*

**RIDEM Specific Comment No. 48:** Page 4-36 & 37, Section 4.3.3.2, Alternative G-3, Reduction of Toxicity, Mobility, or Volume Through Treatment, Paragraph 1 – This paragraph states that arsenic would be addressed through biological and abiotic processes. Please explain how this would occur since it is not clear that either process addresses metals. This comment also applies to Alternative G-2.

***Navy Response to Comment No. 48:*** *Agree with clarification. The text will be revised to indicate that TCE and other VOCs would be degraded though biological and abiotic processes redox reactions and pH changes), and that dissolved arsenic will be immobilized through abiotic processes (such as redox reactions and pH changes).*

**Follow-up RIDEM Comment on Navy Response –** Response is acceptable. The Navy will revise the text to state that TCE and other VOCs can be degraded through biological and abiotic processes and that arsenic can be immobilized through abiotic processes such as redox reactions and pH changes.

***Follow-up Navy Response to RIDEM Specific Comment No. 48:*** *Comment acknowledged. RIDEM accepted Navy's response. (Text will be revised.)*

**RIDEM Specific Comment No. 49:** Page 4-38, Section 4.3.3.2, Alternative G-3, Implementability, Paragraph 1 – See Comment 42 regarding ELURs.

***Navy Response to Comment No. 49:*** *Please refer to response to RIDEM Specific Comment No. 42.*

**Follow-up RIDEM Comment on Navy Response –** See RIDEM comment on Navy response to Comment 42.

***Follow-up Navy Response to RIDEM Specific Comment No. 49:*** *Comment acknowledged. RIDEM accepted Navy's response.*

**RIDEM Specific Comment No. 50:** Page 4-40, Section 4.3.4.2, Alternative G-4, Overall Protection of Human health and the Environment, Paragraph 4, Last Sentence – See Comment 46 regarding vapor intrusion and existing buildings.

***Navy Response to Comment No. 50:*** *Please refer to response to RIDEM Specific Comment* No. 46.

**Follow-up RIDEM Comment on Navy Response –** See RIDEM comment on Navy response to Comment 46.

***Follow-up Navy Response to RIDEM Specific Comment No. 50:*** *Please see Navy response to RIDEM Specific Comment No. 46.*

**RIDEM Specific Comment No. 51:** Page 4-40 & 41, Section 4.3.4.2, Alternative G-4, Long-Term Effectiveness and Permanence – See comment 46 regarding vapor intrusion of existing buildings.

***Navy Response to Comment No. 51:*** *Please refer to response to RIDEM Specific Comment* No. 46.

**Follow-up RIDEM Comment on Navy Responses** – See RIDEM comment on Navy response to Comment 46.

***Follow-up Navy Response to RIDEM Specific Comment No. 51:*** *Please see Navy response to RIDEM Specific Comment No. 46.*

**RIDEM Specific Comment No. 52:** Page 4-42, Section 4.3.5.1, Alternative G-5, Groundwater Extraction and Treatment, MNA, and LUCs, Description – Please add a sixth component – Discharge of VOCs to Atmosphere.

***Navy Response to Comment No. 52:*** *Disagree. VOCs in the air stream from the stripper will most likely be treated by GAC. In any case, the air stream from the stripper is considered* to be part of the overall air treatment component and not a separate component.

**Follow-up RIDEM Comment on Navy Response** – Response is acceptable. VOCs from air stripper will most likely be treated by GAC and the air stream is considered to be part of the overall treatment component and not a separate component.

***Follow-up Navy Response to RIDEM Specific Comment No. 52:*** *Comment acknowledged. RIDEM accepted Navy's response.*

**RIDEM Specific Comment No. 53:** Page 4-46, Section 4.3.5.2, Alternative G-5, Long-Term Effectiveness and Permanence, Paragraph 4, Last Sentence – See comment 46 regarding existing buildings and vapor intrusion.

***Navy Response to Comment No. 53:*** *Please refer to response to RIDEM Specific Comment No. 46.*

**Follow-up RIDEM Comment on Navy Response** – See RIDEM comment on Navy response to Comment 46.

***Follow-up Navy Response to RIDEM Specific Comment No. 53:*** *Please see Navy response to RIDEM Specific Comment No. 46.*

**RIDEM Specific Comment No. 54:** Page 4-48, Section 4.3.5.2, Alternative G-5, Implementability, Paragraph 3, Last Sentence – Please see comment 17 regarding BRAC PMO level approval.

***Navy Response to Comment No. 54:*** *Please see response to RIDEM Specific Comment No. 17.*

**Follow-up RIDEM Comment on Navy Response** – Response is acceptable. Navy will remove references to prior BRAC PMO approval.

***Follow-up Navy Response to RIDEM Specific Comment No. 54:*** *Comment acknowledged. RIDEM accepted Navy's response. (Text will be revised.)*

**RIDEM Specific Comment No. 55:** Page 4-50, Section 4.3.6.1, Alternative G-6, Components 1 and 2: Both of these Components state that sampling would be quarterly for the first year and annually thereafter. Please revise to state that sampling would be quarterly for the first year at which time sampling results will be reviewed to determine subsequent sampling frequency.

***Navy Response to Comment No. 55:*** *Please refer to response to RIDEM Specific Comment No. 28.*

**Follow-up RIDEM Comment on Navy Response** – RIDEM disagrees with the Navy response. Since the Navy in their response notes that the frequency and scope of the monitoring program will be discussed during the development of the monitoring program this implies that the frequency noted in the text is subject to change. Therefore, the Navy should revise the text to state that a monitoring program will be implemented at a later date at which time the frequency, duration and scope will be determined, but for now it is noted that this would be a component of the alternative under consideration.

***Follow-up Navy Response to RIDEM Specific Comment No. 55:*** *The text in the FS concerning monitoring frequency was included for estimating purposes only. As noted in the original response, no changes are proposed at this stage. Please also see response to RIDEM Specific Comment No. 28.*

**RIDEM Specific Comment No. 56:** Page 4-50, Section 4.3.6.1, Alternative G-6, Component 3 MNA – For alternatives G-3, G-4 and G-5 which have some form of treatment as a component, 28 monitoring wells are proposed for the MNA component. Please explain why only 15 wells are proposed for Alternative G-6 MNA component.

***Navy Response to Comment No. 56:*** *Please refer to response to RIDEM Specific Comment* No. 44.

**Follow-up RIDEM Comment on Navy Response** – Response is acceptable. The Navy notes that because the area in question is receiving treatment fewer wells should be needed in this area for long-term monitoring purposes. This is separate from the short-term monitoring wells used for treatment.

***Follow-up Navy Response to RIDEM Specific Comment No. 56:*** *Comment acknowledged. RIDEM accepted Navy's response.*

**RIDEM Specific Comment No. 57:** RIDEM reserves the right to re-review ARARs at the time of the proposed plan and ROD phases.

***Navy Response to Comment No. 57:*** *Comment acknowledged.*

**Follow-up RIDEM Comment on Navy Response** – Response is acceptable. The Navy has acknowledged RIDEM's comment.

***Follow-up Navy Response to RIDEM Specific Comment No. 57:*** *Comment acknowledged. RIDEM accepted Navy's response.*

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**
NEW ENGLAND - REGION I
5 POST OFFICE SQUARE, SUITE 100 (OSRR 07-03)
BOSTON, MASSACHUSETTS 02109-3912

September 26, 2011

Jeff Dale, Dept of the Navy, BRAC PMO Northeast
Code 5090 BPMO NE/JD, 4911 South Broad St
Philadelphia, PA 19112-1303

Re: *"Navy Response to EPA Region 1Comments on the Revised Draft Feasibility Study for Site 16"*, dated August 2011 at the Former Davisville Naval Construction Battalion Center (NCBC), Rhode Island

Dear Mr. Dale:

Pursuant to § 7.6 of the Davisville Naval Construction Battalion Center Federal Facility Agreement dated March 23, 1992, as amended (FFA), the Environmental Protection Agency has reviewed the subject document and comments are enclosed.

We believe there are several outstanding issues that must be resolved soon in light of the newly agreed to schedule.

#1 the requirement for cleanup of groundwater to drinking water standards must, by definition, include risk based health advisories and maximum contaminant level goals (MCLGs) as ARARs.

#2 LUCs under the MARAD transfer should not be discussed as being part of the "no action" alternative.

#3 the groundwater alternative s must be clearly and transparently defined and justified. Please schedule a technical meeting for a more thorough technical discussion of the Navy's groundwater alternatives.

#4 while the use of a waste management unit seems to be agreed upon, the proposed changes to the alternatives have not been provided for EPA review. Please provide.

If you have any questions with regard to this letter, please contact me at (617) 918-1384.

Sincerely,

Christine A.P. Williams, RPM
Federal Facilities Superfund Section

Enclosure

cc: Richard Gottlieb, RIDEM
Dave Barney, BEC (via e-mail only)
Johnathan Reiner, ToNK
Steven King, RIEDC
Bill Brandon, EPA (via e-mail only)
Steve DiMattei, EPA (via e-mail only)
Rick Sugatt, EPA (via e-mail only)
Scott Anderson, Tetra Tech NUS, Inc (via e-mail only)

p. 1, N.Resp.Cmt. 2 In the first paragraph regarding the Navy's ARARs comment – solid or hazardous waste landfill standards may be relevant and appropriate for the site, if waste is going to be left in place under a cap/cover. Some, but not all, of the landfill provisions may be relevant and appropriate, particularly if the waste is debris that was buried on site (such as from filling wetlands). However, the waste does not need to be capped/covered under landfill standards to be a "waste management unit," rather the cap/cover could be compliant with the RI Remediation Regulations (if the cap/cover meets the Regulations risk-based standards).

p. 2, N.Resp.Cmt. 2 and 93 While the proposed cover design may be compliant with direct contact standards, it also needs to meet leachability standards, if they apply. They would apply if the contaminants in the vadose zone potentially could cause a risk by migration into the harbor in the future. A contingency remedy needs to be included in the ROD to ensure a remedy is agreed to if contaminants in the vadose zone above leachability criteria now then migrate to the harbor in the future and cause a risk to the flora or fauna in the nearshore.

p. 7 and p. 12, Response to Comment No. 7 and to Additional EPA General Comment No. 5: Decisions related to PFOS/PFOA can be made after review of forthcoming data.

p. 4,N Respt Cmt 8 A more transparent approach to adding contingency to remediation estimates (such as adding a contingency percentage to treatment costs due to uncertainty in treatment area extent and concentration ) would allow for better transparency and consistency when comparing between alternatives. It is acknowledged that some groundwater treatment alternatives costs are less sensitive to over-estimates of contaminant mass, such as in-situ chemical oxidation which is driven often by total oxidant demand from non-target naturally-occurring compounds and overall size of the treatment area. However, the extent of the treatment area also appears to be overestimated by the Navy, leading to larger than necessary treatment networks (i.e. more extraction wells, injections points, or treatment barriers) under all treatment alternatives. While the RI/FS process is intended to assist with programming of remediation budgets, its primary task in regards to cost is to provide a means for comparison of alternatives. The Navy's approach to building conservatism into each treatment alternative has not allowed for appropriate comparison of the viable alternatives.

p. 15, N.Resp.Cmt. 9 The source of the contamination does not preclude CERCLA liability, so if the PAHs are from asphalt or building debris that has been used as fill at the Site by the Navy historically, the Navy is still responsible for addressing the material under CERCLA. The material does not have to come from a "release from specific units or processes associated with past Navy operations," the filling/disposal of material in the area is a "past Navy operation." Was the asphalt or building debris used as fill in this area?

p. 15, N.Resp.Cmt. 10 A release from "the immediate vicinity of the Sea Freeze building" is still under CERCLA jurisdiction for this Site even though it may not be associated with "the Site 16 CVOC plume." Any releases from within the operable unit that pose a CERCLA risk need to be addressed by the alternatives in this FS. It is understood that this part of the plume is a distal part and that Navy alternatives include MNA to cleanup the distal parts of the plume.

p. 16, N Resp Cmt 15 - 19 The Navy concurred that tighter contours were supported by the data, but that the conservative estimate of potential remediation area was appropriate. However, the Navy's 500 µg/L and 1,000 µg/L isoconcentration contours appear to not accurately depict current VOC

concentrations, and therefore overestimate the area of remediation. A clearer approach to adding contingency to remediation estimates (such as a contingency percentage on costs) would allow for better transparency and consistency when comparing between alternatives. Given that conservative estimates were used for both extent and contaminant mass, the degree of conservatism is not always apparent to the reviewer. See also the technical response to General Comment No. 8.

p. 19. N.Resp.Cmt. 24 EPA asked that the sentence be removed because the State's classification of the groundwater as GB has no relevance to the CERCLA remedy. Instead the Navy can state: "Note that Site 16 is located in an area regulated under the Federal Safe Drinking Water Act as a potable aquifer, except where the groundwater is saline. Safe Drinking Water Act regulatory standards (MCLs and non-zero MCLGs), along with Federal risk-based standards, were used in the selection of COCs."

p. 19, N.Resp.Cmt. 26 Change the Navy's proposed text to: "and meet the selected PRGs identified in Table 2-4 outside of any waste management area established as part of the soil remedy." Note also that Table 2-4 needs to be relabeled "Preliminary Remediation Goals/Performance Standards – Groundwater" with a footnote explaining that inside any waste management area the values are Performance Standards and outside the waste management area the values are PRGs.

p. 19, N.Resp.Cmt. 27 The sentence can read: "No RAOs were developed for TPH contamination in soil since CERCLA does not have jurisdiction for TPH. TPH will be addressed separately under State authority."

p.20, N. Resp Cmt 32 Navy's clarifications addressed validity of development of lead PRG, but not arsenic PRG. The development of a site-specific arsenic background for the site based on collection of 7 samples is not clearly justified. Goodness of fit statistics for the fit of limited background arsenic soil data to a log-normal distribution were not provided, and alternative probability distributions where not presented for the data (which may fit the data better). As such the validity of the fit of the data to this distribution and subsequent use of the log-normal distribution is not fully supported. The use of the Upper Prediction Limit as a PRG rather than the 95% Upper Confidence Limit of the mean (as is done in RIDEM background development) should also be justified further.

p.21, N Resp Cmt 33 The Navy's response does not directly address EPA's concern that the naphthalene background value (500 µg/kg) used as the PRG was not developed based on an EPA-approved method or the site-specific SSL of 18 µg/kg based on leachability. Please address.

p. 22, N.Resp.Cmt. 39 Unclear to EPA what the sentences that we requested removed actually mean. What is the significance of the "relatively high mass" of lead being the reason why the lead is at "environmentally acceptable concentrations." Is the Navy attempting to say: "Although the mass of lead relative to other soil contaminants is high, lead levels do not exceed risk-based standards for unlimited use of the area."

p. 22, N.Resp.Cmt. 41 EPA has determined that Federal Drinking Water (MCLs and non-zero MCLGs) and risk-based standards (Health Advisory for manganese) are the ARARs for groundwater at the Site. They need to be included in Table 2-1 for any

groundwater treatment alternatives as cleanup standards and in Table 2-5 as monitoring standards for any alternatives requiring monitoring and institutional controls for areas within the compliance boundary for any waste management areas. Note that the text for these standards in Table 2-5 is incorrect in that groundwater throughout the Site (where soil contamination is being managed in place) will not achieve drinking water standards inside the compliance boundary. Instead, the standards are only used to monitor the areas to ensure that groundwater exceeding the standards does not migrate beyond the compliance boundary.

p.23, Table — Use Table text for MCLGs as provided by EPA (see previous comment).

p. 24, 1st Table — Use Table text for EPA Health Advisory as provide by EPA (see comment for p. 22, N.Resp.Cmt 41).

p. 24, N.Resp.Cmt. 42. Retain text referring to the 500-year floodplain since the regulation include jurisdiction up to the 500-year flood elevation.

p. 25, N.Resp.Cmt. 44 The Navy's response is inconsistent with its response to Comment 43 in that the Navy agreed to add the Endangered Species Act to address potential sea turtle habitat in Allen Harbor, but states the Fish and Wildlife Coordination Act, which also addresses protecting the aquatic habitat in Allen Harbor is not Applicable. Unless the remediation is outside of the coastal flood zone for the Harbor, include both of these statutes as ARARs.

p. 25, N.Resp.Cmt. 45 EPA's reply to this response is consistent with its previous responses to the Navy regarding groundwater performance standards/PRG and background guidance standards within this document.

Response to EPA Specific Comment No. 46 & 48: concur, provided that this language ("The risk must be evaluated at each well after concentrations of all COCs have decreased below their MCLs." is included in the ROD. EPA reiterates that MCLs are not necessarily considered to be protective if the risk associated with the MCL is higher than EPA's risk management criteria of HQ =1 and cancer risk >1E-04. The NCP requires that remedies achieve both ARARs and protection of human health and the environment.

p. 26, N.Resp.Cmt. 49 As previously noted MCLGs should not be deleted from the Table.

p. 27, N.Resp.Cmt. 50 As previously noted Health Advisories should not be deleted from the Table.

p. 27, N.Resp.Cmt. 51 Pore water and/or sediment monitoring may be required to assess the protectiveness of the groundwater and/or soil alternatives How will it be possible to assess any potential risk if contaminants in the vadose zone leach into groundwater at high enough concentrations or site groundwater plumes move out into the Harbor and emerge into the intertidal or subtidal zone (as occurred at Calf Pasture Point). While there is no current risk from either of these issues, the remedy should include monitoring and a contingency remedy to address any future risk from migration from under the soil cover being proposed.

p.27, N.Resp.Cmt. 52 Any cap/cover installed under the soil alternatives will require storm drainage of some sort. Any cap/cover within the coastal flood zone the cap/cover needs to have drainage that will prevent washout, so these standards need to be complied with.

p. 28, N.Resp.Cmt. 54 Section 3.2 only should cover screening for CERCLA technologies and process options so remove any mention of TPH. If a technology or process option that addresses CERCLA contaminants also addresses TPH that is not a problem but the text shouldn't take into account whether a technology or process option is effective or not in addressing TPH.

p. 29, N Resp Cmt 62 It is unclear to EPA how an effective "cover/containment" remedy can be implemented using newly constructed or existing cover without the integral use of LUCs to ensure the maintenance of such structures. As such, it would appear prudent to add reference to use of LUCs under the containment alternative.

p. 29, N.Resp.Cmt. 64 If the Navy decided the add on-site treatment to the remedy after the ROD without evaluating on-site treatment in this FS the Navy would be required to issue a ROD amendment. If on-site treatment is evaluated in this FS the Navy likely would only need to issue an ESD.

p. 30, N.Resp.Cmt. 68, 72, 75, 88-90,114-117,121,122,125, 130, Although EPA withdraws its opposition to including an alternative for MNA in section 3 given that the Conclusion states that MNA will be used in combination with other process options. Note however that the fourth sentence of the response is inaccurate because the EPA MNA guidance documents EPA policy regarding the use of MNA for CERCLA remedies. Furthermore, the fifth sentence is inaccurate because the Guidance does address what a reasonable time period for MNA is – for example in the first paragraph on page 13 of the Guidance it states: "EPA expects that **MNA will be an appropriate remediation method only where its use will be protective of human health and the environment and it will be capable of achieving site-specific remediation objectives within a timeframe that is reasonable compared to other alternatives."**

However, based on the groundwater data, MNA screening results, and BIOCHLOR modeling results presented, it does not appear that the estimate of the timeframe to achieve the PRGs under alternatives G-2 through G-6 has been done with enough accuracy to warrant that discussion at this point.
Based on a review of the MNA modeling results and groundwater monitoring data for the Site 16, it seems the rate of TCE degradation is overstated by the Navy, and the timeline to site closure under a MNA-only and/or groundwater treatment followed by MNA approach is not able to be accurately estimated by the BIOCHLOR model.
Very limited presence of *cis*-1,2-DCE and vinyl chloride provide the strongest evidence that only insignificant biodegradation is occurring.
The use of site data to calibrate the BIOCHLOR model does not appear to be valid. Firstly, although the model is simplistic it does contain a number of parameters which are calibrated to "fit the data", including rates for longitudinal dispersion, biodegradation of VOCs, and at times seepage rate, and even the input source concentration. With increasing numbers of parameters, more data points are required to effectively calibrate it, increasing the risk of obtaining a great "data fit" or corroboration but from a meaningless model (one which has extra terms which do not actually have any statistical significance or may interfere with proper calibration of the model).
Typically, this is avoided by using larger data sets, and limiting the number of parameters in a model. Although the model has been calibrated to show the shape of the field data, it does not appear possible to prove the varying of the source concentration, seepage rate, and calibration of longitudinal dispersion or biodegradation rate are valid. In other words, the model has too many parameters and/or input assumptions that can be adjusted/calibrated and not

enough data to justify those modeling decisions.
Secondly, the calibration of the model's biodegradation rate does not appear to be valid considering the data used and assumptions made. The biodegradation rate was calibrated using an assumed starting source concentration and one set of groundwater data from approximately 50 years (year 2004) after the release. This is not a sound method as it does not use two data sets separated by time (rather one assumption which is varied based on the best fit of the resulting model and one true data set). This procedure is repeated twice, for a second data set (year 2007), with similar results, which does not make the model any more valid.
The closure timeframes estimates provided by the BIOCHLOR model do not appear valid enough to determine the timeliness of MNA based remedies, and therefore, without further justification MNA is not supported as a viable alternative.
Another approach such as developing a 2-D or 3-D advection and dispersion model (without biodegradation or a very conservative biodegradation rate) based on actual groundwater data (rather than assumed source values) and published parameter values may be more representative of the plume and be more defensible at predicting future timelines to achieve the PRG.
We suggest a technical meeting to more thoroughly discuss this issue and issues concerning the other groundwater alternatives.

Additionally, alternative GW-2 does not demonstrate that the hotspots that act as continuing source areas would be addressed. GW-2, MNA only, is not an acceptable final remedy since the source areas would not be addressed. We have discussed the idea of interim goals of cleanup to the State GB levels actively/quickly with the MNA to kick in after; however, during the meeting on September 22, 2011 Navy did not present any new alternatives with this idea. We tentatively scheduled a meeting for October 18, 2011 to further discuss the groundwater alternatives. Please provide additional information/new alternatives with interim goals prior to the meeting.

p. 30, N.Resp.Cmt. 71 The comment does correspond to the text, but the point EPA was not as clear as it could have been. What EPA was attempting to represent is that if the storm sewer has permit limitations (particularly if it is a CSO) the Navy would need to meet pretreatment/discharge standards at the point where the Navy was discharging into the storm sewer, not at the Bay.

p. 31, N.Resp.Cmt. 73 On-site consolidation would not necessarily trigger landfill and on-site disposal facility regulations any more than cover/capping the waste in place. For instance, consolidation could be done under risk-based standards under the R.I. Remediation Regulations, if appropriate.

p. 32, N.Resp.Cmt. 85 Unclear what the subject of the last paragraph (transfer of properties) has to do with the section, which describes what the selected alternatives are (not how they apply to different land uses within the operable unit).

p. 32, N.Resp.Cmt. 86 The No Action Alternative only pertains to CERCLA actions, not outside land use controls that are not incorporated into the CERCLA remedy. The purpose of the No Action Alternative is to compare taking no CERCLA remedial action (other than 5-year reviews) compared with other CERCLA remedial alternatives. For instance under a CERCLA No Action Alternative an active petroleum remediation under State authority could be occurring within an operable unit, but that would have no relevance in the FS to comparing the No Action Alternative to other CERLCA remedial alternatives. The assumption that land use controls managed

by previous property transfer agreements will stay in place indefinitely does not appear to be a valid. While the No Action Alternative does not include the elimination of these controls, there is not any requirement under this alternative that they will remain either. Therefore, the statement that the LUCs will "remain in place" does not appear to be appropriate. The text should be clarified to reflect this uncertainty, or reference to the existing LUCs removed.

p. 33, N.Resp.Cmt.88 In this section remove both the second and fourth sentences since neither existing non-CERCLA land use restrictions no natural attenuation have any relevance to the No Action Alternative, since neither is a remedial component of the alternative.

p. 33, N.Resp.Cmt. 89 Remove the sentence – the only subject that should be discussed regarding meeting NCP standards for this criterion is whether the alternative includes active treatment as a component of the CERCLA remedy, which the No Action Alternative does not.

p. 33, N.Resp.Cmt. 94 Remove the second sentence since capping is not "treatment" under this criterion. The statement regarding generation of investigation derived waste does not seem pertinent to the section. EPA's request for removing this sentence appears to be appropriate.

p. 34, N.Resp.Cmt. 95 Based on the Navy's response, change the first sentence to: "Overall, the sustainability impact of Alternative S-2 is low to moderate based on sustainability analysis using SiteWise™ (see Appendix H)."

new comment 95A Appendix H, Sustainable Evaluation of Remedial Alternatives: EPA did not complete a detailed technical evaluation of the analysis presented in Appendix H. In general, EPA supports Navy's efforts to evaluate the sustainability of planned remediation efforts and identify opportunities to mitigate environmental impacts of the remediation. EPA agrees that these considerations can be evaluated under the short-term effectiveness criteria. In addition, EPA agrees with Navy's statements to others that "(t)he results presented ...are provided with the intention of giving more information in order to make a more intelligent decision on which treatment to use". Further, EPA suggests that a valuable use of the results presented here will be in the design of the selected remedy to ensure that the drivers of any significant impacts are considered and that those environmental impacts are mitigated to the extent practicable. The Navy's efforts should be consistent with EPA Region 1's Clean and Green Policy issued on February 18, 2010 (http://www.clu-in.org/greenremediation/docs/R1GRPolicy.pdf). In addition, EPA has developed a number of Green Remediation Fact Sheets that provide best management practices (BMPs) for a number of common remediation processes. Navy should consider these as they move forward with the remediation of the NUSC site: excavation and surface restoration (http://www.clu-in.org/greenremediation/docs/GR_Quick_Ref_FS_exc_rest.pdf), bio-remediation (http://www.clu-in.org/greenremediation/docs/GR_factsheet_biorem_32410.pdf), and clean fuel and emission technology (http://www.clu-in.org/greenremediation/docs/Clean_FuelEmis_GR_fact_sheet_8-31-10.pdf). Review of these BMP fact sheets may provide additional recommendations for reducing the environmental footprint of the remedies that could be added to the Recommendations Section of this analysis.

p. 34, N.Resp.Cmt. 96 The backfill is a cover in all locations where the subsurface soil under the cover

poses a CERCLA risk to unlimited use. Note that groundwater monitoring at the compliance boundary of any area where waste is left in place would be required under waste management ARARs standards even if there was no current groundwater risk requiring a CERCLA groundwater remedy.

p. 34, N.Resp.Cmt. 97 Lead at this site is not naturally occurring. The comment refers to the statement in the sentence that the lead does not pose a CERCLA risk – this is only true if the lead does not pose a risk to unlimited use. Only the pounds of lead that pose a risk should be included in the calculation of contaminants removed under the alternative.

p. 35, N.Resp.Cmt. 100 and 107See EPA's response to N.Resp.Cmt. 93.

p. 35, N.Resp.Cmt. 101, 108, & 112 See EPA's response to N.Resp.Cmt. 95.

p. 35, N.Resp.Cmt. 103 If the presence of co-mingled TPH with the CERCLA waste results in higher remedial costs, that added cost for addressing the TPH should not be included in the analysis.

p. 35, N.Resp.Cmt. 104 See EPA's response to N.Resp.Cmt. 96.

p. 35, N.Resp.Cmt. 105 See EPA's response to N.Resp.Cmt. 97.

p. 36, N.Resp.Cmt. 110 and 113See EPA's response to N.Resp.Cmt. 103.

p. 37, N.Resp.Cmt. 114, 116, 117, 121,122, 125 See EPA's response to N.Resp.Cmt. 68. A reasonable time for an MNA needs to be compared to active remedies. Outside of any waste management area compliance zone established under the soil alternatives groundwater needs to meet drinking water standards through MNA within a time period comparable to active treatment alternatives. It does not matter that groundwater is currently not being used as a potable water supply (see EPA groundwater remediation guidance).

p. 37, N.Resp.Cmt. 115 See EPA's response to N.Resp.Cmts. 86, 88, and 89.

p. 38, N.Resp.Cmt. 118 See EPA's response to N.Resp.Cmt. regarding the Table 2 ARARs. The revised alternative-specific ARARs tables needs to be provided for EPA to fully comment on.

p. 38, N.Resp.Cmt. 119 The text for the TBC risk guidances Action to Be Taken should state that the No Action Alternative will not meet risks calculated using the guidances. Based on standards for other CERCLA sites in the Region, if PCBs exceed 1 ppm they require remedial action under TSCA's risk-based standards.

p. 38, N.Resp.Cmt. 120 See EPA's response to N.Resp.Cmts. 41 (regarding both MCLGs and EPA's Health Advisory) and 119.

p. 39, N.Resp.Cmt. 123 EPA will need to review the revised Section 5.0 to determine if the Navy has incorporated all of the issues raised in EPA's responses to the Navy's Response to Comments. The compliance zone around the potential waste management area needs to be delineated to determine where groundwater (outside of the compliance zone and outside of areas with saline groundwater) requires treatment.

p. 39, N.Resp.Cmt. 124 EPA will need to review the revised Tables to determine if the Navy has

incorporated all of the issues raised in EPA's responses to the Navy's Response to Comments.

p. 40, N.Resp.Cmt. 126 Note from previous EPA responses that groundwater treatment to federal drinking water standards is only required for groundwater outside of the compliance zone for any waste management area established and outside of any area with saline groundwater (if the groundwater poses a risk to ecological receptors in Allen Harbor, then some additional remediation in saline areas might be required).

p.45, N Resp Cmt 131 It was not EPA's intent to propose a two well approach to capture the contaminant plume down gradient of the former Building 41 area, but rather to question the rationale behind a remedy that requires 45 extraction wells. The equation used by EPA can be sourced from Figure 14 on page 21 of EPA publication 600/R-08/003 (rather than Figure 13 on page 20). As the written and diagrammatic definitions of the variables provided on Figure 14 indicate, Y is the capture zone width from central line of the plume, or half the full width of the capture zone. Thus, the full width (w) of the capture zone will equal 2 x Y. Figure 14 provides formulae for the capture width in terms of Y for both the maximum upgradient capture zone and the capture zone at the extraction well. It is correct that EPA's previous calculation provided the value of the capture width Y for the maximum capture zone rather than at the extraction well itself. If the capture zone immediately adjacent to the extraction well were considered, the total width of the capture zone would be 100.6 feet. It is correct that if the overburden aquifer were homogeneous with no impediments to vertical flow, it would be appropriate to use the full saturated thickness of the aquifer when computing capture zone widths. However, the stratigraphy observed at the site suggests significant hydraulic conductivity contrasts in the overburden that will likely influence the width of a capture zone created by an extraction well, particularly in the area immediately adjacent to the extraction well. While the hydraulic rationale underlying the design of the extraction system considered as a remedial alternative has not been clearly established in the FS, it appears that this design also relies on the screening of extraction wells over discrete depths in an apparent attempt to capture the contaminant plume at isolated depths in the overburden. Thus, the Navy also appears to intend to focus capture on discrete depths rather than the entire saturated overburden. Additional discussion and hydraulic analysis are necessary to justify the assumption that 45 extraction wells are necessary to contain the plume in Site 16 Area. Please schedule a technical meeting to discuss this and other groundwater alternative issue noted in these comments.

RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
235 Promenade Street, Providence, RI 02908-5767 TDD 401-222-4462

13 September 2011

Mr. Jeffrey Dale, RPM
U.S. Department of the Navy
BRAC PMO, Northeast
4911 South Broad Street
Building 679, PNBC
Philadelphia, PA 19112

RE: NCBC Site 16 Feasibility Study, Revised Comments
Navy Response to RIDEM 14 June 2011 Comments
Davisville, Rhode Island
Submitted 17 August 2011, Dated 15 August 2011

Dear Mr. Dale:

The Rhode Island Department of Environmental Management, Office of Waste Management (RIDEM) has reviewed the above referenced document and has the following comments to offer:

- General Comment – The soil alternatives address residential and commercial/industrial use, but note that residential use is not permitted on the MARAD property. This is true. What the soil alternatives do not address is the existing and anticipated future recreational use of the MARAD property. There is a small portion of the marina and also contained within the Site 16 boundaries that is currently recreational in land use and will remain so well into the future. The feasibility study must address this land use and be accounted for in the soil alternatives.

  **RIDEM Comment on Navy Response - The next to last column in Table 2-3 implies that the direct exposure criteria for recreational use are the same as industrial/commercial direct exposure criteria. Section 3.5.8 of the RIDEM Remediation Regulations clearly notes that unrestricted outdoor recreational areas are subject to the residential direct exposure criteria. Section 3.3.4 of the RIDEM Remediation Regulations does not apply to the marina (explanation provided in Comment 4). Please revise Table 2-3 to show recreational use along with residential PRGs.**

- General Comment - To save the Navy resources for the soil alternatives, where direct contact only is an issue, RIDEM could accept 6" of clean soil with a minimum of 4" of asphalt or concrete or 1' of clean soil underlain with a geo-fabric material and an appropriate ELUR to maintain said covers.

  **RIDEM Comment on Navy Response – Response is acceptable. The navy will note this in the text and be considered in the design phase.**

1. Page 1-12, Section 1.2.3.2, Site 16 Geology, Paragraph 2, Sentence 3: *"Also in the North Central Area of the site and toward Allen Harbor, relatively recent material was deposited on top of the undisturbed deposits but below the reworked soil and fill material (including the observed waste materials)."* Please clarify this sentence as it is not clear how recently deposited materials are below reworked soil and fill materials.

   **RIDEM Comment on Navy Response – Response is acceptable. The navy will clarify wording in Section 1.2.3.2.**

2. Page 1-20, Section 1.2.4, Nature and Extent of Contamination, Metals: This section notes the EPA Industrial/Commercial screening criteria for lead as 800 mg/kg. Please be advised that the RIDEM Industrial/Commercial direct exposure criteria for lead is 500 mg/kg. Please revise this section accordingly.

   **RIDEM Comment on Navy Response – The Navy states that they will add a sentence acknowledging the RIDEM Industrial/Commercial Direct Exposure criteria of 500 mg/kg, however, the Navy conducted a Method 3 risk assessment and reference the USEPA IEUBK and TRW models for assessment of lead in soils. Please be advised that RIDEM does not accept the USEPA IEUBK model for lead due to the methodology used to derive the PRGs. Therefore, RIDEM will defer to the Method 1 Direct Exposure Criteria.**

3. Page 1-23, Section 1.2.6.1.1, Soil Exposure Units, Bullet 3: This bullet states that a forensics analysis indicates that PAHs found in this area (south of Building 41) are from coal tar pitch and building materials rather than from fuel, therefore no remedial action is proposed. Since this is a public document, please explain the circumstances under which the decision was made not to remediate this contamination (additional sampling) since clean-up standards are based on level of contamination, irrespective of source.

   **RIDEM Comment on Navy Response – Response is acceptable.**

4. Page 1-25, Section 1.2.6.1.2, Risk Summary, Paragraph 1: This paragraph notes that Site 16 is not currently used for residential purposes and the anticipated future use of the land is commercial/industrial. A portion of the site is currently a marina

and is expected to remain so well into the future. Section 3.58 of the RIDEM Remediation Regulations notes that recreational areas are subject to residential direct exposure criteria. Please revise this paragraph to note that recreational criteria (residential direct exposure criteria) apply to the portion of the site that is leased by the Yacht Club that lies within the boundaries of IR Site 16.

**RIDEM Comment on Navy Response – Section 3.3.4 of the RIDEM Remediation Regulations does not apply to the marina. The intent of Section 3.3.4 was to allow recreational uses on industrial land that would essentially be restricted to the firm's employees and not open to the general public. These areas would still require some form of protective cover with appropriate ELUR, but would otherwise meet industrial/commercial direct exposure criteria.**

**The Navy Yacht Club, by its very nature, is a recreational activity. Moreover, the Navy Yacht Club is open to the general public (it is recognized that customers must meet certain minimum requirements to dock their boats there) and for all intents and purposes is unrestricted. Therefore Section 3.58 of the RIDEM Remediation Regulations apply.**

**Of the entire Yacht Club parcel, approximately one acre (42,000 $ft^2$) lays within the Site 16 boundaries. Of that one acre RIDEM only has concerns with approximately 1000 $ft^2$ of soil to the southeast of Building E-107 (EBS Item 60). In their response to this comment the Navy has proposed numerous restrictions to be applied to the property (any structure that would promote other recreational activities, playgrounds or anything that would promote more intense exposure to soils). Given the limited nature of the soil contamination, RIDEM does not see the need to encumber the entire property with these proposed restrictions. RIDEM would suggest that the contaminated soil be removed or if the Navy insists on the restrictions that they apply only to that small portion of contaminated soil along with a soil cover and soil management plan.**

5. Page 2-1, Section 2.1, Media of Concern, Paragraph 2: It is stated in this paragraph that Rhode Island does not have an EPA-endorsed Comprehensive State Groundwater Protection Program so Rhode Island's GB groundwater classification was not used in the development of PRGs and remedial alternatives. Please be advised that standards for groundwater classified as GB are based on promulgated regulations and are therefore valid standards whether EPA endorses them or not. Please revise this paragraph in addition to revising the PRGs to include the RIDEM GB groundwater classification.

**RIDEM Comment on Navy Response – Response is acceptable, however, please note in the text, in this paragraph, that EPA's Class II groundwater classification has more stringent standards than RIDEM's GB groundwater classification and this is why they are being used.**

6. Page 2-5, Section 2.2.2, Chemicals of Concern in Groundwater, Bullet 2, Last Sentence: Based on this sentence it appears that only dissolved COCs that exceed either MCLs or RSLs are included for further consideration in the FS. Please be advised that Table 1, associated with Rule 11.3 of the RIDEM Groundwater Quality Regulations require that analysis be based on *unfiltered samples*. Please include aluminum, lead, silver and thallium in the analysis.

   **RIDEM Comment on Navy Response – Response is acceptable. The Navy has stated that they agree remedial decisions should be based on unfiltered samples, however, in some of the unfiltered groundwater samples metals concentrations appeared to be a function of turbidity and salinity. The Navy also states that metals concentrations in groundwater are not associated with Site 16 source areas. The Navy also notes that the lack of significant metals concentrations in Site 16 soil, particularly from the developed portion of Site 16 supports this conclusion. Please note, however, that there are metals in the undeveloped portion of the site.**

7. Page 2-6, Section 2.3, Remedial Action Objectives, Paragraph 3: This paragraph states that the site will be used for commercial and industrial purposes only. Please revise this paragraph to note that a portion of the site is occupied by the Yacht Club, which under the RIDEM Remediation Regulations is defined as recreational use. Please note this will also affect the soil remedial action objectives in Section 2.3.1.1.

   **RIDEM Comment on Navy Response – See RIDEM comment on Navy response to General Comment 1 and Specific Comment 4.**

8. Action Specific ARARs: A Table needs to be included for action specific ARARs. The following items need to be placed in this table:

| Process | Requirement | Status | Synopsis | Action to be Taken to Meet ARAR |
|---|---|---|---|---|
| Groundwater Monitoring | Rules and regulations for Groundwater Quality (12-100-006) | Applicable | Rules and regulations intended to protect and restore the quality of the State's groundwater. Includes groundwater monitoring requirements and monitoring well construction abandonment. Also establishes groundwater quality standards and/or requirements | Groundwater monitoring program will comply with these regulations |
| | Rhode Island Hazardous Waste Management Act of | Relevant and Appropriate | Rules and regulations for hazardous waste generation, | Wastes generated during monitoring and excavation |

| | | | | |
|---|---|---|---|---|
| | 1978 (RIGL 23-19.1 et seq. | | transportation, treatment, storage, and disposal. They incorporate, by reference, the Federal RCRA requirements. | activities will be managed in accordance with these regulations. |
| | Water Pollution Control (RIGL 46-12 et seq) and Water Quality standards and Ambient Water Quality Guidelines | Relevant and Appropriate | Establishes water use classifications and water quality criteria for all waters of the State. Establishes acute and chronic ambient water quality criteria for the protection of aquatic life. | Discharges of groundwater from the site to surface water will comply with the substantive portions of these regulations to the extent they are more stringent than federal standards |
| | State of Rhode Island Rules and Regulations for the Investigation and Remediation of hazardous material Releases; DEM-DSR-01-93 – Sections 9, 10, 11 and 12 | Relevant and Appropriate | Establishes minimum requirements for a remedial action work plan, approvals, the remedial action and requirements for managing arsenic in soil | These sections are required in order to insure proper steps are accomplished to successfully implement the ultimate remedial response and arsenic is a COC. |

**RIDEM Comment on Navy Response – Bullet 1; Groundwater Monitoring – response is acceptable. Bullet 2; Hazardous Waste Management Regulations – Disagree with Navy response, if one of the alternatives involves excavation and off-site disposal then the transportation and disposal portion of the Regulation is relevant and appropriate. Bullet 3; Water Pollution Control Regulations – response is acceptable. Bullet 4; Remediation Regulations – The USEPA Region 9 Regional Screening Level (June 2011) is 0.39 mg/kg (residential) and 1.6 mg/kg (industrial) which are risk based numbers. RIDEM Remediation Regulations are based on the 95% UCL. It is unlikely that RIDEM would approve of a PRG greater than what the Remediation Regulations allow. Therefore, please include Section 12 of the RIDEM Remediation Regulations as an ARAR.**

9. Table 2-2, Location Specific ARARs : The following need to be added to this table:

| Process | Requirement | Status | Synopsis | Action to be Taken to Meet ARAR |
|---|---|---|---|---|
| | Rhode Island Historic Preservation Act (RIGL 42-45 et. Seq.) | Applicable | This act requires the recovering and preservation of archeological and historic data and artifacts when threatened by a publicly funded | Compliance with this requirement in the event historical or archeological artifacts are discovered during remedial activities. |

| | | | | |
|---|---|---|---|---|
| | | | action. | |

**RIDEM Comment on Navy Response – Response is acceptable provided that documentation showing coordination with the Rhode Island Historical Preservation Society has taken place.**

10. Table 2-3; Preliminary Remediation Goals – Soil – Under the column for RIDEM Direct Contact Risk – Under this column PRGs are provided for Residential, Commercial and Recreational scenarios. For the recreational scenario it is consistently labeled as NA (Not Applicable). Please revise this to be the same value as the residential PRG since Section 3.58 of the RIDEM Remediation Regulations defines recreational use as having the same maximum exposure criteria as residential use.

    **RIDEM Comment on Navy Response – See RIDEM comment on Navy response to General Comment 1 and Specific Comment 4.**

11. Page 2-14, Section 2.5.2, Action Specific ARARs, Paragraph 1, Sentence 1: "Action-specific ARARs and TBCs are technology or activity based regulatory requirements or guidance that would control or restrict remedial action." Please change this to: "Action-specific ARARs and TBCs are technology or activity based regulatory requirements or guidance that would provide upper or lower boundaries on the implementation of remedial actions." The ARARs and TBCs do not restrict one's choice of a reasonable remedial action, they just place boundaries on what is acceptable.

    **RIDEM Comment on Navy Response – The Navy responded that the original statement is a variation of the text that appears in guidance documents for ARARs. If the Navy does not like RIDEM's revision to this statement then replace it with the actual statement in the guidance document.**

12. Page 3-5, Section 3.2.2.1, LUCs, Effectiveness – Arsenic, lead, benzene, TPH, PAHs and other organics remain at the site. It is pointed out that prohibiting residential use would prevent the occurrence of unacceptable risk to human receptors from direct exposure to contaminated soil. Please revise this paragraph to state that at various locations all the above mentioned COCs also exceed commercial/industrial direct exposure criteria. It would follow then that commercial/industrial use would also need to be prohibited. Clearly this is not reasonable. Perhaps the entire paragraph should be revised to state that LUCs, by themselves are not effective in protecting human health and the environment, but instead could be used to supplement a more aggressive remedial action.

    **RIDEM Comment on Navy Response – Response is acceptable. Navy agreed to revise text.**

13. Page 3-6, Section 3.2.3, Containment, Effectiveness, Last Sentence: This sentence points out that capping and covering is typically incompatible with residential development that would make maintenance very difficult. Please revise the sentence to point out that under the industrial/commercial scenario the same could also be said where development of the land is likely. There is no guarantee on how long NORAD will remain at the site and many portions of Parcels 7 and 8 have yet to be developed.

    **RIDEM Comment on Navy Response – Response is acceptable. Navy agreed to revise statement.**

14. Page 3-7, Section 3.2.4, Removal, Paragraph 1: Please explain and provide a reference as to why the load bearing capacity of the soil must be greater than 1,500 $lb/ft^2$ in order to consider a removal action. In addition, please provide the test results that Navy has taken of the load bearing capacity of the soil at Site 16 along with a map delineating areas of less than 1,500 $lbs/ft^2$ since apparently this will have an impact on where removal actions can be implemented. As a reminder to the Navy, at Tank Farm 4 at Naval Education and Training Center in Newport an oil/water separator and oil contaminated soil was removed from wetlands. In addition, as part of an NRDA claim from the US Fish and Wildlife Service muck was dug out of the wetlands that lie between Calf Pasture Point and Allen Harbor Landfill to improve flora quality. It is highly unlikely that the load bearing capacity of these soils was in excess of 1500 $lbs/ft^2$. Perhaps the Navy should consider the use of a lighter piece of equipment for soil removal.

    **RIDEM Comment on Navy Response – Response is acceptable. Navy will remove this text from document.**

15. Table 3-2; Preliminary Screening of Remedial Technologies and Process Options For Groundwater, LUCs, Passive Controls, Screening Comment: This section notes that groundwater use is restricted through the MARAD and LIFOC. The LIFOC ends once the land is transferred and MARAD use is not guaranteed (QDC could decide to just purchase the land). Please revise to state that depending on alternative selected an **environmental** groundwater restriction would need to be placed on the land in accordance with RIDEM Remediation Regulations.

    **RIDEM Comment on Navy Response – Response is acceptable provided that it is pointed out the *environmental* LUCs will be prepared as part of the ROD and LUC remedial design.**

16. Page 3-14, Section 3.5.2.1, LUCs, Bullet 1, Parcel 7 - This paragraph states that MARAD has determined that residential use of the property would likely not qualify as an acceptable use of the property. While this is true, MARAD does approve of the use of the property for marinas (information obtained from RIDEC). As the Navy is well aware, under the RIDEM Remediation Regulations, a marina is

considered recreational use. The clean-up standards for recreational use are the same as the residential clean-up standards. Please note this in this paragraph.

**RIDEM Comment on Navy Response – See RIDEM comment on Navy response to General Comment 1 and Specific Comment 4.**

17. Page 3-18, Section 3.5.3.1, Extraction Wells, Implementability, Paragraph 2 – The last sentence states that BRAC PMO approval is required prior to the implementation of this alternative. This statement should be removed as it makes it sound as though the Navy is proposing an alternative they cannot implement.

    **RIDEM Comment on Navy Response – Response is acceptable. Navy will remove references to prior BRAC PMO approval.**

18. Page 3-23, Section 3.5.5.1, Filtration, Implementability, Paragraph 2 – See comment 17. In addition, given the nature of groundwater contamination, it would seem that filtration would not be a stand alone alternative, but rather would be used in conjunction with another alternative. Please explain why the Navy feels this technology would require special approval from the BRAC PMO.

    **RIDEM Comment on Navy Response – Response is acceptable. Navy will remove references to prior BRAC PMO approval.**

19. Page 3-25, Section 3.5.5.2, Air Stripping, Implementability, Paragraph 1 – See comment 17.

    **RIDEM Comment on Navy Response – Response is acceptable. Navy will remove references to prior BRAC PMO approval.**

20. Page 3-25, Section 3.5.5.3, Liquid-Phase GAC Adsorption, Paragraph 3 - Please change NPDES to RIPDES as Rhode Island has an EPA approved program.

    **RIDEM Comment on Navy Response – Response is acceptable. Navy will change NPDES to RIPDES.**

21. Page 3-26, Section 3.5.5.3, Liquid-Phase GAC Adsorption, Implementability, Paragraph 2 – See comment 17.

    **RIDEM Comment on Navy Response – Response is acceptable. Navy will remove references to prior BRAC PMO approval.**

22. Page 3-28, Section 3.5.5.5, Neutralization/pH Adjustment, Implementability, Paragraph 2 – See comment 17.

    **RIDEM Comment on Navy Response – Response is acceptable. Navy will remove references to prior BRAC PMO approval.**

23. Page 3-30, Section 3.5.6.1, Direct Surface Discharge, Effectiveness & Implementability - Please change NPDES to RIPDES as Rhode Island has an EPA approved program.

**RIDEM Comment on Navy Response – Response is acceptable. Navy will change NPDES to RIPDES.**

24. Page 4-3, Section 4.1.1.7, Cost – This section notes a planning horizon of 30 years, but does not include an interest rate. Please provide the interest rate used to generate present value costs for the alternatives. The interest rate used can have an impact on alternative selection.

**RIDEM Comment on Navy Response – Response is acceptable. The Navy will add the interest rate of 2.3% to the text.**

25. Page 4-6, Section 4.2.1.1, Alternative S-1: No Action, Description – This section notes that residential use, groundwater extraction and uses limited to port activities are included as restrictions on property use, though they are not environmental in nature. Please note that recreational use of the property exists and is permitted as noted in comment 16.

**RIDEM Comment on Navy Response – See RIDEM comment on Navy response to General Comment 1 and Specific Comment 4.**

26. Page 4-8, Section 4.2.2.1, Alternative S-2, Description – Six major components are stated, but only five are presented. Please correct.

**RIDEM Comment on Navy Response – Navy agrees with response, though it is not clear if there is a sixth component to the alternative or if the six will be changed to a five.**

27. Page 4-10, Section 4.2.2.1, Alternative S-2, Component 3: Excavation near Marina – The Marina, under RIDEM Remediation Regulations, is considered recreational use and therefore Residential Direct Exposure (RDEC) criteria apply. The depth of excavation would be until the RDEC are met or groundwater is encountered. Whichever is first. The depth of groundwater in this area is not deep and allowances for the structural integrity of Building E-107 can be made. Please revise this section accordingly.

**RIDEM Comment on Navy Response – See RIDEM comment on Navy response to General Comment 1 and Specific Comment 4.**

28. Page 4-10, Section 4.2.2.1, Alternative S-2, Component 4: Monitoring – The last paragraph, of this section, states that monitoring would be quarterly for the first year, semi-annual for the next 2 years and annual thereafter. RIDEM typically

monitors on a quarterly basis for two years (to get seasonal variations among other things) and evaluates the data to determine subsequent monitoring frequency. Please revise accordingly.

**RIDEM Comment on Navy Response – RIDEM disagrees with the Navy response. Since the Navy in their response notes that the frequency and scope of the monitoring program will be discussed during the development of the monitoring program this implies that the frequency noted in the text is subject to change. Therefore, the Navy should revise the text to state that a monitoring program will be implemented at a later date at which time the frequency, duration and scope will be determined, but for now it is noted that this would be a component of the alternative under consideration.**

29. Page 4-11, Section 4.2.2.1, Alternative S-2, Component 5: LUCs, Bullet 1 – This bullet states that the purpose of the conveyance of the property is for development and operation of a port facility in perpetuity and that residential use of the property would not likely be an accepted use of the property. This is true. The paragraph should also note that recreational use of the property can be an accepted use. As noted in comment 16 a marina is a permitted use. In addition a bicycle path traverses the northern border of the MARAD property. Please revise this paragraph to reflect the recreational use of the property.

    **RIDEM Comment on Navy Response – See RIDEM comment on Navy response to General Comment 1 and Specific Comment 4.**

30. Page 4-11, Section 4.2.2.1, Alternative S-2, Component 5: LUCs, Last Paragraph, Second Sentence - This sentence states that an LUC would be added to protect the caps and covers. Since the purpose of this land is for development please state if the LUC would preclude development of construction over the caps and covers.

    **RIDEM Comment on Navy Response – The Navy agrees with the comment and notes that LUCs are not intended to prevent development and if development plans affect cover/cap systems, their functions must be restored. The response is acceptable, but more precisely, it should be noted in the text that a soil management plan would be developed to allow for the development of the property while still maintaining the environmental protection aspects of the cover/cap.**

31. Page 4-12, Section 4.2.2.2, Alternative S-2, Detailed Analysis, Overall Protection of Human Health and Environment – This paragraph describes protection for residential and industrial use, but does not address the existing and anticipated future recreational use. Please address the recreational use of Site 16 (marina).

    **RIDEM Comment on Navy Response – See RIDEM comment on Navy response to General Comment 1 and Specific Comment 4.**

32. Page 4-14, Section 4.2.3.1, Alternative S-3, Description, Component 1: Excavation - The first sentence states that COC concentrations greater than industrial PRGs would be excavated to a depth of 2 feet bgs. Please revise this to account for the recreational use associated with the marina. In the marina area the soil would need to be excavated to a depth sufficient to meet RDEC or to the water table, whichever occurs first.

    **RIDEM Comment on Navy Response – See RIDEM comment on Navy response to General Comment 1 and Specific Comment 4.**

33. Page 4-16, Section 4.2.3.2, Alternative S-3, Detailed Analysis, Overall Protection of Human Health and the Environment, Paragraph 1, Sentence 1 – This sentence states that Alternative S-3 would be protective of human health and the environment. At this time RIDEM does not agree with this statement as Alternative S-3 does not address the recreational land use of the marine within the boundaries of Site 16.

    **RIDEM Comment on Navy Response – See RIDEM comment on Navy response to General Comment 1 and Specific Comment 4.**

34. Page 4-17, Section 4.2.3.2, Alternative S-3, Detailed Analysis, Implementability, Last Sentence – This sentence notes that there are few structures near the excavation areas, therefore the need for shoring is limited. For consistency, the concerns associated with the marina should be mentioned in this section.

    **RIDEM Comment on Navy Response – The Navy agrees with the comment and notes that protection of the marina building by shoring will be specifically identified.**

35. Page 4-19, Section 4.2.4.1, Alternative S-4, Description, Component 1: Excavation – Based on Figure 4-4 there will be a 10' excavation adjacent to the marina building. For consistency the concerns of excavating by this building should be mentioned.

    **RIDEM Comment on Navy Response – The Navy agrees with the comment and notes that protection of the marina building by shoring will be specifically identified.**

36. Page 4-19, Section 4.2.4.1, Alternative S-4, Description, Component 2: Excavation near Marina – "This component would be similar to Component 3 of Alternative S-3." It is assumed Component 2 is in reference to the remedy. Component 3 of Alternative S-3 which in turn references Component 5 of Alternative S-2 relate to LUCs which would cover excavations resulting from development of this land. It is not clear how LUCs are a factor in the excavation associated with the remedy for this site. Please explain.

**RIDEM Comment on Navy Response – Navy response is acceptable. The Navy notes that the text is not correct and will be revised to "Component 3 of Alternative S-2".**

37. Page 4-20, Section 4.2.4.2, Alternative S-4, Detailed Analysis, Overall Protection of Human Health and Environment – This section states that an LUC would be placed on the site limiting its use to industrial scenarios. A portion of the site is currently and in the foreseeable future going to be used for recreational purposes. This paragraph must recognize this. Please revise accordingly.

    **RIDEM Comment on Navy Response – See RIDEM comment on Navy response to General Comment 1 and Specific Comment 4.**

38. Page 4-27, Section 4.3.1.1, Alternative G-1, No Action, Description, Paragraph 1, Sentence 2 – This sentence notes that LUCs are in place to prevent residential uses of the property and to prevent groundwater use for the portion of the site north of Davisville Road. Please note that RIEDC also has restrictions on groundwater use for the property south of Davisville Road. In addition, for this groundwater alternative, as well as the others, please remove references to land use (residential, commercial, industrial or otherwise) as they have no bearing on RIDEM Remediation Regulations Groundwater Objectives or EPA MCLs.

    **RIDEM Comment on Navy Response – (Part 1) The Navy notes that they need only be notified of well installation, but RIEDC does not allow water supply wells and requires tenants to purchase water through RIEDC. Navy will revise text to reflect this. RIDEM concurs with response.**

    **(Part 2) Navy responded by agreeing that land use does not determine groundwater classification, but is included for context as it can affect vapor intrusion PRGs. RIDEM concurs with response as vapor-intrusion based PRGs may be less than RIDEM GB or GA Groundwater Objects as well as USEPA MCLs.**

39. Page 4-30, Section 4.3.2.1, Alternative G-2, MNA & LUCs, Component 1 MNA, Paragraph 4 – This paragraph states that monitoring would be conducted annually. Typically, RIDEM requires quarterly sampling for the first two years at which time the data is reviewed to determine subsequent monitoring frequency. Please revise accordingly.

    **RIDEM Comment on Navy Response – RIDEM disagrees with the Navy response. Since the Navy in their response notes that the frequency and scope of the monitoring program will be discussed during the development of the monitoring program this implies that the frequency noted in the text is subject to change. Therefore, the Navy should revise the text to state that a monitoring program will be implemented at a later date at which time the frequency,**

**duration and scope will be determined, but for now it is noted that this would be a component of the alternative under consideration.**

40. Page 4-31, Section 4.3.2.1, Alternative G-2, MNA & LUCs, Component 2: LUCs, Bullet 1 – Please remove the reference to land use as this has no basis with regard to groundwater issues.

    **RIDEM Comment on Navy Response – See RIDEM response to Comment 38 (Part 2).**

41. Page 4-31, Section 4.3.2.1, Alternative G-2, MNA & LUCs, Component 2: LUCs, Bullet 2 – Please note, in this bullet, that once a Record of Decision has been completed the Navy, within 18 months, is responsible for insuring that an Environmental Land Use Restriction (ELUR) has been placed on the property, north of Davisville Road, delineating the appropriate restrictions.

    **RIDEM Comment on Navy Response – Response is acceptable. The Navy will revise the document to note that LUCs will be consistent with ELURs.**

42. Page 4-34, Section 4.3.2.2, Alternative G-2, MNA & LUCs, Implementability, Paragraph 2 – This paragraph states that LUCs would be incorporated into the LUCIP for the property under Navy control, however, the administrative aspects for property not under Navy control will require coordination with the current property owner and/or local or state officials. Please remove the and/or local or state officials. With respect to local officials the only coordination would be the recording of an ELUR at the town hall. With respect to state officials the only coordination would be to insure the ELUR addresses what it needs to. Neither the Town nor the State can place an ELUR on the property in question without the consent of the property owner.

    **RIDEM Comment on Navy Response - The Navy responded that the "and/or local or state officials" was added at the request of the USEPA. The concern was that the Navy was expecting that either local and/or state officials would become responsible for producing and/or negotiating the ELUR. It is the Navy's responsibility to work with the property owner to obtain the ELUR. Based on consultation with the USEPA the phrase may remain since the Navy and the property owner do need to coordinate with local and state officials to the extent of recording and insuring the terms of the ELUR are met.**

43. Page 4-34, Section 4.3.3.1, Alternative G-3, In-Situ Chemical Oxidation, MNA and LUCs, Paragraph 1 – Please change "four major components" to "three major components".

    **RIDEM Comment on Navy Response – Response to comment is acceptable; For alternative G-3 the Navy will change four major components to three major components.**

44. Page 4-35, Section 4.3.3.1, Alternative G-3, In-Situ Chemical Oxidation, MNA and LUCs, Component 2: MNA – It is proposed for Alternative G-2 that 36 wells would be needed for monitoring purposes. It is stated in this paragraph that it is assumed that only 28 wells would need to be monitored, presumably because of the treatment. Until one knows how well the sodium permanganate is being distributed within the plume 36 wells should be monitored. After a certain period of time the data can be evaluated, and if appropriate, the number of monitoring wells could be reduced (or increased) for both Alternatives G-2 and G-3. This should be incorporated into the description of the respective components of the alternatives.

    **RIDEM Comment on Navy Response – Response is acceptable. The Navy notes that because the area in question is receiving treatment fewer wells should be needed in this area for long-term monitoring purposes. This is separate from the short-term monitoring wells used for treatment.**

45. Page 4-35, Section 4.3.3.1, Alternative G-3, In-Situ Chemical Oxidation, MNA and LUCs,, Component 3: LUCs, - See Comment 41regarding ELURs.

    **RIDEM Comment on Navy Response – Response is acceptable. The Navy will revise the document to note that LUCs will be consistent with ELURs.**

46. Page 4-36, Section 4.3.3.2, Alternative G-3, Overall protection of Human health and the Environment, Paragraph 2, Last Sentence – This sentence states that vapor intrusion would be controlled by building construction methods. Since the plume is moving please state if contingencies have been made for addressing existing buildings.

    **RIDEM Comment on Navy Response – RIDEM disagrees with the Navy response. The Navy has stated the LUC boundaries are based on the extent of contamination with considerations for plume migration and therefore cover/account for migration. RIDEM believes that there should be contingencies to address vapor intrusion into existing buildings if only as a pro-active move. As we have seen from the long-term monitoring programs from Allen Harbor Landfill and Calf Pasture Point, which are about a decade old, the plumes do move and not always in the direction that we expect. As the issue of vapor intrusion evolves it is certain that the ways in which we sample, test and determine risk will be improved and refined. Assuming that we have an appropriate long-term monitoring program we should be able to know well beforehand whether existing buildings are at risk of unacceptable vapor intrusion.**

47. Page 4-36, Section 4.3.3.2, Alternative G-3, Long-Term Effectiveness and Permanence, Paragraph 4, Last Sentence – See comment 46 regarding existing buildings and vapor intrusion.

**RIDEM Comment on Navy Response – See RIDEM comment on Navy response to Comment 46.**

48. Page 4-36 & 37, Section 4.3.3.2, Alternative G-3, Reduction of Toxicity, Mobility, or Volume Through Treatment, Paragraph 1 – This paragraph states that arsenic would be addressed through biological and abiotic processes. Please explain how this would occur since it is not clear that either process addresses metals. This comment also applies to Alternative G-2.

    **RIDEM Comment on Navy Response – Response is acceptable. The Navy will revise the text to state that TCE and other VOCs can be degraded through biological and abiotic processes and that arsenic can be immobilized through abiotic processes such as redox reactions and pH changes.**

49. Page 4-38, Section 4.3.3.2, Alternative G-3, Implementability, Paragraph 1 – See Comment 42 regarding ELURs.

    **RIDEM Comment on Navy Response – See RIDEM comment on Navy response to Comment 42.**

50. Page 4-40, Section 4.3.4.2, Alternative G-4, Overall Protection of Human health and the Environment, Paragraph 4, Last Sentence – See Comment 46 regarding vapor intrusion and existing buildings.

    **RIDEM Comment on Navy Response – See RIDEM comment on Navy response to Comment 46.**

51. Page 4-40 & 41, Section 4.3.4.2, Alternative G-4, Long-Term Effectiveness and Permanence – See comment 46 regarding vapor intrusion of existing buildings.

    **RIDEM Comment on Navy Response – See RIDEM comment on Navy response to Comment 46.**

52. Page 4-42, Section 4.3.5.1, Alternative G-5, Groundwater Extraction and Treatment, MNA, and LUCs, Description – Please add a sixth component – Discharge of VOCs to Atmosphere.

    **RIDEM Comment on Navy Response – Response is acceptable. VOCs from air stripper will most likely be treated by GAC and the air stream is considered to be part of the overall treatment component and not a separate component.**

53. Page 4-46, Section 4.3.5.2, Alternative G-5, Long-Term Effectiveness and Permanence, Paragraph 4, Last Sentence – See comment 46 regarding existing buildings and vapor intrusion.

**RIDEM Comment on Navy Response – See RIDEM comment on Navy response to Comment 46.**

54. Page 4-48, Section 4.3.5.2, Alternative G-5, Implementability, Paragraph 3, Last Sentence – Please see comment 17 regarding BRAC PMO level approval.

    **RIDEM Comment on Navy Response – Response is acceptable. Navy will remove references to prior BRAC PMO approval.**

55. Page 4-50, Section 4.3.6.1, Alternative G-6, Components 1 and 2: Both of these Components state that sampling would be quarterly for the first year and annually thereafter. Please revise to state that sampling would be quarterly for the first year at which time sampling results will be reviewed to determine subsequent sampling frequency.

    **RIDEM Comment on Navy Response – RIDEM disagrees with the Navy response. Since the Navy in their response notes that the frequency and scope of the monitoring program will be discussed during the development of the monitoring program this implies that the frequency noted in the text is subject to change. Therefore, the Navy should revise the text to state that a monitoring program will be implemented at a later date at which time the frequency, duration and scope will be determined, but for now it is noted that this would be a component of the alternative under consideration.**

56. Page 4-50, Section 4.3.6.1, Alternative G-6, Component 3 MNA – For alternatives G-3, G-4 and G-5 which have some form of treatment as a component, 28 monitoring wells are proposed for the MNA component. Please explain why only 15 wells are proposed for Alternative G-6 MNA component.

    **RIDEM Comment on Navy Response – Response is acceptable. The Navy notes that because the area in question is receiving treatment fewer wells should be needed in this area for long-term monitoring purposes. This is separate from the short-term monitoring wells used for treatment.**

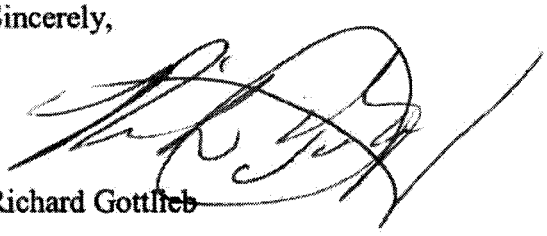
57. RIDEM reserves the right to re-review ARARs at the time of the proposed plan and ROD phases.

    **RIDEM Comment on Navy Response – Response is acceptable. The Navy has acknowledged RIDEM's comment.**

RIDEM would like to thank you for the opportunity to comment on this document and looks forward to working with the Navy and USEPA. If you have any questions or

require additional information please call me at (401) 222-2797 ext. 7138 or email me at richard.gottlieb@dem.ri.gov.

Sincerely,



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